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NON-INTELLECTUAL FACTORS IN COGNITIVE EFFICIENCY.

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THIS SERIES OF STUDIES INVESTIGATED THE RELATIONSHIP BETWEEN PERSONALITY ORGANIZATION AND COGNITIVE FUNCTIONING. PART I PRESENTS RESEARCH REPORTS EXAMINING THE RELATIONSHIP BETWEEN EFFICIENCY ON TWO COMPLEX COGNITIVE PERCEPTUAL TASKS AND SEVERAL PERSONALITY DIMENSIONS. IT WAS CONCLUDED THAT COGNITIVE-PERCEPTUAL EFFICIENCY CAN BE RELATED TO IMPORTANT PERSONALITY VARIABLES. PART II CONSISTS OF STUDIES ON THE RELATIONSHIP BETWEEN PERSONALITY VARIABLES AND COGNITIVE FUNCTIONS ASSESSED BY SEVERAL SUBTESTS OF THE WECHSLER ADULT INTELLIGENCE SCALE. THREE STUDIES INVESTIGATE TEMPORAL CONCEPT. THE OBJECT ASSEMBLY SUBTEST IS SUSCEPTIBLE TO INTERFERENCE. THE RELATIONSHIP BETWEEN THE INFORMATION AND COMPREHENSION SUBTESTS AND SEXUAL IDENTITY IS EXPLORED, AS IS THE RELATIONSHIP BETWEEN ENERGY DEPLOYMENT AND ACHIEVEMENT. NEGATIVISM AS MEASURED BY THE RORSCHACH IS CORRELATED WITH VARIOUS TYPES OF SUCCESS ON THE DIGIT SPAN SUBTEST. FAILURE IMPROVES PERFORMANCE ON DIGIT SPAN AND DIGIT SYMBOL SUBTESTS. A STUDY ON ANXIETY INDICATES THAT THIS FACTOR REDUCES RESPONSES TO PERIPHERAL STIMULI. (PR)

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PREFACE

Thought, perception, and visual-motor organization are basic psychological functions which form a matrix from which many stable and persistent modes of adaptation evolve. Modes of adaptation include the defenses used in coping with internal conflict and external stress, the symptom formations seen in psychological disorders, and also the relatively neutral and conflict-free functions such as interests and skills. These modes of adaptation are based on variations in the preferred ways of thinking, perceiving, and experiencing (Shapiro, 1965). Though cognitive and perceptual functions may be expressed in somewhat different form in psychological defenses than they are in conflict-free interests and skills, there still should be a basic similarity in the cognitive-perceptual functions that an individual tends to utilize in most situations (conflictual or conflict-free). These consistencies can be conceptualized as the stable and persistent modes of adaptation. Recent research on cognitive styles and cognitive control principles (Gardner, Holzman, Klein, Linton & Spence, 1959; Gardner, Jackson and Messick, 1961) has offered some support for the formulation that there are consistent and preferred modes of cognition-perception which are utilized in relatively neutral, conflict-free situations as well as in the psychological defenses used to cope with internal and external conflict and stress. Thus, there seems to be a complex interweaving between cognitive-perceptual processes and personality organization. The study of cognition-perception should provide salient data about personality dimensions and conversely, the study of personality should permit inferences to be made about cognitive-perceptual functioning. There are a number of ways in which the complex inter-relationships between personality and cognition-perception can be systematically studied. In the present research the inter-relationships between personality on the one hand and thinking, perception and visual-motor organization on the other, will be examined by studying some personality correlates of efficiency on a variety of tasks.

The first section of this report presents a series of studies which examine the relationship between efficiency on two complex cognitive-perceptual tasks and personality dimensions such as the extent to which illogical, inconsistent or drive-laden elements enter into thinking and the degree to which the individual is capable of integrating this more "primitive" mode of functioning into realistic and appropriate responses. Much theoretical discussion and research has been devoted to the assumption that both drive-laden, illogical thinking (primary process thought) and the ability to integrate these elements in appropriate responses plays a role in creativity (Kris, 1952; Schafer, 1958). Frequently, the illogical and drive-laden elements are seen as the "well springs" of inspired thought, whereas the ability to integrate primary process thought is viewed as an indication of the capacity for the integrative or elaborative phase of the creative process. Part I of this report presents attempts to study some aspects of this conceptualization of the creative process.

Part II of this report is devoted to examining, in a somewhat different way, the assumption that cognitive efficiency is related to personality dimensions. The relationship between cognitive efficiency and personality dimensions does not necessarily mean that the overall intellectual level is directly related to the degree of personality organization. Rather, within a given intellectual level, it is assumed that the efficiency with which the general intellectual level is expressed and utilized in specific cognitive-perceptual functions relates to personality variables. Thus, there may not necessarily be a significant relationship between IQ and degree of psychopathology. Rather, given a general intellectual baseline, the level of efficiency on the specific cognitive-perceptual processes which constitute the composite IQ, may vary as a function of personality variables. This hypothesis has been the basis for much of the research on the relationship between personality variables and cognitive processes. With essentially normal subjects, similar in intellectual and educational level, many studies have examined the relationship between cognitive-perceptual functions and personality variables. The second part of this report will present a series of studies with subjects of essentially similar intelligence and education on the relationships between efficiency in particular cognitive-perceptual functions and personality dimensions. Studies in this section, rather than examining correlates of efficiency on complex tasks, will investigate the relationship between more specific cognitive-perceptual functions and more limited personality variables. This series of studies will examine some hypotheses that have been developed about the personality variables which are assumed to be assessed by several of the subtests of the Wechsler Intelligence Scales. Many of these hypotheses have been derived from the psychoanalytic ego psychology formulations of David Rapaport and his colleagues

(1945, 1951) in their discussions of the relationships between Wechsler subtest patterns and personality organization.

Somewhat parenthetically, it should be noted that many of the studies in both Part I and II of this report utilized tests from the standard clinical psychological diagnostic battery (e.g., WAIS, TAT, and Rorschach) as part of the research design. To some degree in a number of the studies to be reported, one might also consider the findings from the vantage point of the validity of certain assumptions made in diagnostic psychological testing.

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PART I

Studies of the relationship between efficiency on complex cognitive-perceptual tasks and personality organization

CHAPTER I

INTRODUCTION

While the literature on the relationship of cognitive efficiency to personality and motivation variables is voluminous, the vast portion of this research is concerned with cognitive efficiency on tasks which involve primarily rote learning. There is much less known about the relationship of personality variables to cognitive efficiency on complex tasks, and what is known, seems somewhat contradictory. The studies of the relationship of personality variables and cognitive efficiency can be grouped into three major categories: a) those which have examined the relationship of pre-existing personality traits (e.g., rigidity, anxiety level); b) those which have examined the effects of experimentally induced stress (e.g, failure, time pressure, electric shock) on cognitive efficiency; and c) those which have examined the interaction of personality variables and induced stress and their effects on cognitive processes. The purpose of the present research is to explore further the first area; the relationship between enduring and stable aspects of personality organization and cognitive efficiency on complex problem solving tasks.

The personality characteristic most frequently investigated in research on problem solving had been the individual's predisposition to anxiety, usually measured by anxiety questionnaires. There have been some studies suggesting that general anxiety impairs cognitive efficiency in complex or difficult tasks. A number of investigators (e.g., Grice, 1955; Kerrick, 1955) have found negative correlations between manifest anxiety scales and measures of cognitive efficiency. In general, however, the majority of studies relating measures of general anxiety to cognitive efficiency on complex tasks have yielded insignificant findings (e.g., Dana, 1957; Sarason, 1959; Taylor, 1955). Studies which have examined test anxiety (that is anxiety experienced in test situations) rather than general anxiety as a personality measure, seem to have found somewhat more consistent results. In most of these experiments, Ss scoring high on test anxiety are less efficient on cognitive measures such as SAT, ACE, and Grade Point Average (e.g., Cowen, 1957; I Sarason, 1957; Sarason & Mandler, 1952). It should be noted, however, that even where significant correlations are found between test anxiety and measures of cognitive efficiency, these correlations, though significant, are small and usually in the range of .15 to .30. In addition, there is evidence (e.g., Spielberger, 1958) that the relationship between anxiety and cognitive efficiency is found only in subjects in the middle and lower end of the intellectual scale, and no significant relationship has been found between anxiety and cognitive efficiency for subjects who are at higher intellectual levels.

Some studies have explored the interaction of anxiety with other variables (e.g., motivational instructions and task complexity) and their effect on cognitive efficiency. I. Sarason (1958) for example, studied the effects of anxiety under threatening versus reassuring instructions and found that personal threat was disruptive on an anagrams task for _S_s with high anxiety but that the high anxious _S_s were significantly better with reassurance than _S_s with lower levels of anxiety. Graff (1957) on the other hand, found that failure stress improved the performance of high anxious _S_s in anagrams solutions, while approval disrupted performance. Such contradictory findings not only exist between different experiments but even with the same experimental procedures, conducted by the same experimenters (Travers, Marron and Post, 1955). Thus, the studies which have investigated the relationship between anxiety and cognitive efficiency on complex tasks present a confusing picture. Differences in findings may be a function of the types of tasks used, and variations in stress utilized or samples studied. These inconsistencies make it difficult to derive generalizations or conclusions from these studies.

Two primary problems in interpreting the numerous studies in this area are the wide variety of tasks used in assessing cognitive efficiency and the wide variety of methods used to measure personality factors. The tasks used in assessing cognitive efficiency have included such diverse problems such as mirror tracing, the Einstellung (water jars) tasks, anagrams, and Maier's two string problem, and there has been little attempt to examine how these measures of cognitive efficiency relate to each other or to more general criteria of cognitive efficiency. In studying the relationship between personality variables and cognitive efficiency, one of the crucial steps must be the selection of a measure of cognitive efficiency which has a relationship to a meaningful external criterion. For this reason, the John-Rimoldi Problem Solving Apparatus (PSI) was selected as the cognitive task for several studies to be presented here. John

(1957) reports that PSI efficiency correlates better with college comprehensive examination grades than either ACE Scores or prior college grades. Performance on the PSI was also found to have a significant relationship to estimates of research creativity of Ph.D. scientists (Blatt and Stein, 1959) and to College Entrance Examination Board scores and college grades (Blatt, 1963). These findings are particularly impressive since they occur with Ss of superior intellectual ability who represent a relatively restricted sample of intellectual ability. Thus, though PSI is only one type of problem solving situation, the measure of cognitive efficiency derived from this task seems to have significant generality beyond the immediate experimental situation.

The second major methodological problem in studying the relationship between personality variables and cognitive efficiency is the measurement of personality variables. The anxiety questionnaire has been most frequently used. While convenience and reliability of a questionnaire are important issues, one must question whether a pencil and paper scale provides a measure of the most important personality dimensions to be considered. As S. Sarason (1960) has pointed out, probably the most parsimonious statement that can be made about the anxiety questionnaires, is that they measure the extent to which an individual is willing to admit experiencing anxiety. High anxiety scores may be obtained by high anxious Ss or by those Ss who tend to attribute "bad" characteristics to themselves, or in others who are frank and open or perceptive of their reactions. In this regard, it should be noted that many questionnaires correlate highly and negatively with measures of defensiveness, test taking attitude, and social desirability (Edwards, 1957; Fordyce, 1956). Recent investigators (Kaplan, 1965; Spielberger et al., 1966) have begun to view anxiety scale scores as indications of defensive style rather than as a measure of the amount of anxiety experienced in situations per se. High anxious Ss may not necessarily experience more anxiety than low anxious Ss, but rather, deal with the anxiety by thinking and talking about it freely rather than coping with anxiety by denial and repression.

Because of the problems inherent in questionnaires and also as an attempt to consider personality variables evaluated with more clinically oriented procedures, several recent studies have explored the relationship between cognitive efficiency and dimensions of personality organization as assessed on the Rorschach. Some of these studies have utilized a system developed by Holt (1962) which assesses the amount and type of primary process thinking on the Rorschach and the effectiveness of the attempts to integrate this primary process material into appropriate and realistic responses. Though earlier research with the Rorschach has often yielded very discouraging findings, recent studies utilizing the Holt system have been encouraging (e.g., Heath, 1961; Pine & Holt, 1960; Von Holt, Sengstake, Sonoda, Draper, 1960). The Holt analysis of the Rorschach is based primarily on Freud's distinction of two types of mental processes (Freud, 1913); a secondary process which is logical, rational, realistic thinking, and a primary process thought which is drive-laden and in which logical and realistic consideration such as the distinction between wish and reality and logical contradictions are ignored. Primary process thought, in contast to secondary process thought, is illogical, inconsistent, drive-infused and ideas are often condensed, displaced, symbolic and arbitrary. Primary process thinking is evident in many aspects of behavior, including humor, thinking of children and of primitive people, in the creative process, and under stress, fatigue or in psychopathology. The Rorschach tends to elicit primary process thought for as Holt and Havel (1960) have commented: "The subject is called on to produce a series of visual images. This is a preferred mode of operation for the primary process; without the requirements (such as the TAT imposes) to produce a connected narrative, there is less demand for organizing and synthesizing and less necessity for secondary process thinking. Moreover, the inkblots offer complex stimulus configurations, richly enough varied to evoke and support almost any kind of image that may be latent in the viewer's mind, yet without actually and unmistakably representing anything in reality (p. 267)." The freedom and lack of structure permits and encourages percepts with any degree of fancifulness or realism, depending on the individual's internal standards.

As will be elaborated more fully, Holt scores two types of primary process thinking; one, based on the degree to which the thinking contains drive material, and two, the degree to which the responses are based on illogical thinking. In addition to scoring the degree to which these two types of primary process thinking are present, the Holt system also allows for the measurement of the degree to which this primary process material is integrated into appropriate and realistic Rorschach responses. Holt calls this degree of control and defense "Defense Effectiveness", and it is a measure of the individual's ability to integrate illogical and drive laden thinking with more appropriate and realistic thought. It is important to stress at this point, however, that good defense effectiveness does not mean rigid controls where there is no access to primary process elements. Rather, good defense effectiveness indicates that primary process thinking does appear and that it is integrated with more rational, neutral, secondary process modes of functioning.

An underlying assumption of several of the present studies is that this capacity to effectively modulate primary process thinking with more secondary process thought is an essential feature in effective functioning and it is this integrative capacity which should be reflected in all areas of cognitive functioning, including logical problem solving.

In psychological development, the child experiences and tries to cope with much ambiguity and contradiction. Much of this complexity stems from the child's immature perceptions of reality where he tends to misperceive or misunderstand events. Events can appear to the child as illogical, contradictory and confusing. Experiences of complexity and ambiguity can also stem from the child's evolving attempts to modulate and channel his affects and drives. Though these intense feelings may seem appropriate and genuine to the child, reality frequently contradicts, thwarts and forces control on the expression of these emotions. These same issues, only in much more subtle form, may also be much of the source for the adult's experiences of ambiguity and complexity. In both the child and adult it may be the experiences and capacities gained in dealing with these very personal forms of complexity which may relate to the capacity to deal with more general cognitive complexity. Thus, the capacity to integrate effectively drive representations and segments of illogical thought with more secondary process thought in Rorschach responses may represent the capacity to tolerate and to deal successfully with more general ambiguity and complexity. The central hypothesis of the first study of this section of the report, therefore, is that better Defense Effectiveness on the Rorschach will correlate with the cognitive efficiency on a complex cognitive test such as PSI. This study is presented in Chapter II.

In addition to examining the relationship between the cognitive efficiency on the PSI and the amount and type of primary process thinking and defense effectiveness, the Rorschach protocols will also be scored along more traditional dimensions. Thus, Chapter II will also present the exploration of the relationship between cognitive efficiency and traditional Rorschach dimensions such as locations (W, D, Dd), determinants (Color, Form, Movement, Shading), the accuracy of perception (F+), and the range of content. These analyses will be essentially exploratory in nature with one exception; that is, the examination of the extent and quality of the whole response and its relationship to cognitive efficiency.

The particular interest in the Rorschach the whole response (W) is based on the assumption that it expresses an individual's capacity for "abstracting, surveying and integrated" (Rapaport, et al., 1945) and therefore should relate to complex cognitive functioning. Despite the clinical assumption that the W responses reflect intellectual capacities and strivings, research attempts have generally failed to substantiate the relationship of W responses to cognitive efficiency. Correlations of W responses with cognitive efficiency range from being highly negative in some studies, to positive findings in a few studies. By and large, however, most studies have found essentially negligible correlations between the number or per cent of W and other measures of cognitive efficiency. One of the possible reasons for the contradictions in the findings in this area may be that most studies have taken just sheer number of percent of W responses, without attempting to differentiate types of W responses. S. Sarason (1954) in discussing a study in which a negative correlation was found between W responses and the mental age of mental defectives, concludes that the W responses of defectives are gross and of a low level and reflect their concrete conceptualization of the blot. Sarason stressed the importance of considering the quality of the W response. A study of Wishner (1948) brings into focus even more sharply the necessity of attending to the W responses. Wishner, when ignoring quality of the W responses, obtained a correlation of only .008 between the number of W responses and IQ. When he related the number of W on only the more complex cards (Cards 8, 9 and 10) with IQ, however, a clear relationship between ability to produce W and IQ was obtained ($r = .59$). Though Wishner's judgment about the complexity of the cards may be correct, it is not certain the responses themselves were complex and accurately perceived. In the study to be presented in Chapter III, the quality of W responses will be scored according to the Friedman Developmental Scoring system (1953). The hypothesis is that it is primarily the production of more highly complex, well articulated and well integrated whole responses (and not whole responses generally) which relate to cognitive efficiency, and therefore to efficiency on a problem solving task such as the PSI which requires abstraction and integration.

Thus far the primary criterion of cognitive efficiency in the present series of studies has been the PSI apparatus. As discussed earlier, efficiency on the PSI does have significant correlation with a number of estimates of cognitive efficiency such as grades, college entrance exam scores, and estimates of research creativity. The PSI, however, presents very rational problems based on defined types of logical relationships. Though the functioning on the PSI may have generality, it is still a highly specific and limited type of problem. In order to understand more fully the relationship between cognitive-perceptual efficiency and the Rorschach variables of amount and type of primary process thinking and defense effectiveness, functioning on another type of cognitive-perceptual task was also correlated with these Rorschach variables. Since the PSI is a highly logical, cognitive task, the second series of tasks utilized were selected because they measured the capacity to perceive in ways which contradict usual perceptual experiences, that is, a "tolerance for unrealistic experiences" (TUE). The concept of TUE was first proposed by Klein and Schlesinger (1951) and in the present study it was assessed by four tasks; the phi phenomena, aniseikonic lens, reversible figures (Klein, Gardner, and Schlesinger, 1962) and the identification of stimulus incongruity (Haber, 1964). This research on TUE and its relationship to primary process and defense effectiveness was conducted by Alan Feirstein and is presented in detail in Chapter IV.

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CHAPTER II

Rorschach Correlates of Problem Solving Efficiency

Several recent studies have examined the relationship between efficiency on complex cognitive tasks and the amount and type of primary process on the Rorschach (Defense Demand) and the effectiveness of the integration of these primary process elements with more adaptive features (Defense Effectiveness). Von Holt, Sengstake, Sonoda, and Draper (1960), using an early version of the Holt system, studied the relationship between primary process on the Rorschach and cognitive efficiency on the Hanfmann-Kasanin Concept Formation task. Efficient Ss had more image-fusion responses (responses which contain features which do not exist in reality) and responses with oral content, than did inefficient subjects. Recent findings (Holt, 1966) offer further support for the positive relationship between cognitive efficiency and oral content on the Rorschach. Holt found that oral content was also positively related to efficiency on another cognitive-perceptual task, the Stroop Color-Word Test.

Heath (1961) studied correlates of the amount and type of primary process and Defense Effectiveness on the Rorschach. College students rated by faculty and students as "well organized" had better Defense Effectiveness than those rated "poorly organized." Heath also found that several tests of conceptual thinking, analytic and synthetic reasoning, and realistic judgment correlated significantly with Defense Effectiveness. Pine and Holt (1960) studied the quality of imaginative production (e.g., Guilford's Blocks Uses the Consequences Test) and found that performance on these tests did not relate to amount of primary process material, but did correlate significantly with Defense Effectiveness. While the findings of Pine and Holt are interesting, the sample on which the results were obtained, contained only 13 male _Ss_, and the finding was not replicated in a subsequent sample of unemployed actors (Pine, 1962). Thus, there seems to be some suggestion that cognitive efficiency relates to certain aspects of Drive Demand (oral images and fusion responses). Several other studies, however, indicate that it is primarily Defense Effectiveness, and not Defense Demand, which correlates with cognitive efficiency.

In the Holt Primary Process scoring system there is a measure which combines Defense Demand and Defense Effectiveness into a composite measure called Adaptive Regression. Pine and Holt found that this measure of Adaptive Regression also correlated with imaginative productivity and Cohen (1960) found that it correlated with estimates of creativity. In Cohen's study, however, it was only Adaptive Regression which correlated with creativity. Neither Defense Demand nor Defense Control (an earlier version of Defense Effectiveness) related to estimates of creativity when number of responses containing primary process dimensions were controlled. Only the major constituent of Defense Effectiveness, the Form Level of the responses, related significantly to creativity. These early findings with the Holt system, though somewhat inconsistent, were encouraging and the present study was designed to extend and clarify this earlier research.

Method

The study of the relationship between cognitive efficiency and personality dimensions was conducted with 50 male graduate students obtained from University employment bureaus. Subjects were paid $2.00/hr. for participation and were selected so that there was approximately equal representation from biological sciences, physical sciences, social sciences and the humanities. Subjects were seen in random order and given the problem solving task in the first session. The Rorschach Test was administered in the second session by an E who had no knowledge of subjects performance on the problem solving task.

Problem Solving Apparatus:

Cognitive efficiency was assessed on the John-Rimoldi PSI apparatus. Since this procedure has already been described in detail (John, 1957; Blatt & Stein, 1959) only a brief description is presented here.

On the apparatus, the subject uses a panel containing a circular array of nine lights plus a center light. Next to each of the nine outer lights is a button, which, when pressed, lights up its corresponding light. Some of the lights are interrelated; in one type of relationship, for example, when button A is pressed, light A comes on, followed in the next time cycle (three seconds later) by light B, with which it is related. The existence of a relationship between the lights is indicated by arrows on a removable disc, and there are different discs for each problem. An arrow indicates one of three types of relationships: 1) A direct causation effect--such that the activation of A causes B to light in the next interval. 2) A facilitative or combiner effect--such that A plus another light, X, which also has an arrow going to B, can light B, if and only if, A and X are lit simultaneously. 3) A blocking effect--such that A prevents X (which has an arrow to B) from lighting B, i.e., X can light B only if A has not been activated. S is instructed about the types of relationships that exist on the apparatus, but he is left to discover or infer the specific relationships within each problem.

In solving a problem S's task is to discover the one correct sequence of the three buttons at the bottom of the circle that will light the center light, which has no activating button. S may use any of the buttons that he wishes to discover relationships, but may use only the three buttons at the bottom in the final solution.

Thus, S must press buttons to gather information about the logical relationships within the problem and must also press buttons when testing his various attempts to integrate this information. All buttons pressed are automatically recorded in temporal sequence, yielding a printed record of S's problem solving process. Each sequence of interacting button presses is regarded as a question put to the apparatus. In the sequential analyses of the problem solving process it is possible to specify if a particular series of button presses (question) was ideally necessary for the solution of the problem. The number of unnecessary questions asked while solving the problem is the primary problem solving efficiency. While time to reach the solution of the problem can also be a useful measure of problem solving efficiency it correlates highly with number of unnecessary questions (usually around .80) and yet consistently somewhat lower with other measures. Thus, time seems to be a metric which is external to the problem solving process which only approximates the more sensitive measure (number of unnecessary questions) (Blatt & Stein, 1959).

In the sequential analysis of the responses, the crucial points of Necessary and Sufficient Information and Analysis-Synthesis Shift can be identified for each S. The point of Necessary and Sufficient Information is based upon a logical analysis of the individual's button presses. It is the point at which the individual first has available (either by direct observation or by inference) all the information necessary for solution. The Analysis-Synthesis Shift is the point that best meets the following two conditions: where most of the analytic questions have already been asked and most of the synthetic questions still remain to be asked. Analytic questions are defined as those in which one side of the question is unity and the question seeks the constituent parts of that unity (Duncker, 1945), that is, questions where there is one cause and one effect, or one cause and multiple effects or multiple causes and a single effect. Synthetic questions are those in which there are both multiple causes and multiple effects; where the question involves an attempt to integrate information. The Analysis-Synthesis shift point is located where the difference between the percentage of analytic questions asked and the percentage of synthetic questions asked is maximum (a/A-s/S=Maximum) ("a" and "s", are respectively the number of preceding analytic and synthetic questions). This maximum value also indicates the extent to which the problem solving process is organized into distinct analysis and synthesis phases. In addition to the number of unnecessary questions as a measure of inefficiency, certain characteristics of the inefficiency can also be specified in terms of the number of non-abstract, redundant and unique questions. The number of unique questions in a problem solving performance is a paradoxical measure, because it may represent both a type of inefficiency as well as an attempt at cognitive restructuring (Dunker, 1945). By studying the number of unique questions in a problem solving performance, estimates of the capacity to ask questions which restructure the cognitive field can be confounded with the level of inefficiency of the performance.

A more adequate evaluation of the relative capacity for restructuring would be the proportion of a subject's overall inefficiency which is devoted to questions which reflect restructuring as compared to simple redundant questions (those which have been asked before). A meaningful measure of the capacity for restructuring, therefore, may be the ratio of unique to redundant questions. Non-abstract questions are not included in this measure, because only a very limited number of non-abstract questions can be asked. The unique to redundant ratio, seems to offer a meaningful statement about the relative composition of a subject's inefficiency, independent of the level of efficiency of the performance.

To summarize, the main measures of inefficiency in the PSI task are the number of unnecessary questions S asks while solving the problem. The Analyses-Synthesis shift point and Unique/Redundant ratio are seen as secondary measures of efficiency on the PSI apparatus.

Rorschach Test--The Rorschach was administered according to Rapaport instructions (Rapaport, Gill & Schafer, 1945), by an experienced clinical psychologist who had no knowledge of the Ss' performance on the PSI. Test sessions were tape recorded and verbatim protocols were typed from the tapes.

Rorschachs were scored according to the procedures described by Rapaport et al. (1945).

In addition to the scoring outlined by Rapaport et al., the protocols were scored for the extent and type of primary process thinking in the Rorschach responses (e.g., drive-laden or illogical thinking) and the extent to which these primary process features are integrated with adaptive and realistic thought (Defense Effectiveness) (Holt, 1962; Holt and Havel, 1960).

I. Primary Process Scores:

The two major types of primary process responses scored are formal and content primary process.

a. Formal Primary Process: This is an assessment of the degree to which Rorschach responses deviate from logical, orderly, realistic thinking. This assessment is based on the "perceptual organization of the response," "the thought process that underlies responding" and "the language in which the response is verbalized" (Holt, 1962). The scoring of formal primary process elements includes indications of the usual elements of the primary process or syncretic thought such as condensation, displacement, substitution, and symbolization (Freud, 1900) and the relative lack of "conjunctive and causal, temporal and other relationships" (Rapaport, 1954). Included are responses which deviate from what can be seen in reality (e.g., "a rabbit with bat wings"). Also included would be a response where some element suggests unrealistic or non-logical thought. These would include responses with logical contradictions (e.g., "old maids, but they look younger"), unlikely activities (e.g.,"Ubangis playing patty cake") or verbal condensations (e.g., "diaphragram" - a condensation of diagram and diaphram).

b. Content Primary Process: This is a measure of the extent to which responses contain drive-related (libidinal or aggressive) content. Responses are classified for the presence and intensity of oral, anal, sexual, exhibitionistic-voyeuristic, homosexual and aggressive images.

c. Defense Demand (ΣDD/R): Defense Demand is a summary score for both types of primary process response and is based in part on what Holt considers as the "shock value" of the response. Defense Demand is scored on a 5 point scale which indicates the intensity, directness, and primitiveness of the drive content and the extent to which the formal aspects deviate from conventional, logical considerations. Scores range from more "socialized" responses (e.g., mad, angry look, man with wings - Icarus) to more bland expressions (e.g., cannibilistic or mutilative imagery or contaminatory responses such as a lion egg because it is the shape of an egg and the color of a lion).

In addition to a measure of total Defense Demand, separate scores can be obtained for Content Defense Demand and Formal Defense Demand. It should be stressed that the amount of Defense Demand in each score, is taken as a percentage of total number of responses (ΣDD/R).

II. Defense Effectiveness (ΣDE/#Primary Responses):

Defense Effectiveness is an assessment of the degree to which drive-laden, non-logical thinking is integrated into a more realistic and understandable response. In part, the adequacy of the integration of drive and illogical elements with more realistic features is expressed in the degree to which the responses match the properties of the card (form level), the degree to which the response is placed in an appropriate aesthetic or cultural context, and the degree to which the individual derives pleasure from the response. Thus, the rating of Defense Effectiveness is based on the following factors:

a. The form level of the response, which is a measure of the accuracy with which the concept matches or fits the blot area used. The response with good form level allows other people to see and share the percept, and hence makes the unrealistic response more understandable, acceptable, and convincing as a cummunication. Good form level also indicates that S's ability to perceive in a rational, orderly way is not disrupted by the unrealistic content of the response.

b. The degree to which the response is given in a cultural, aesthetic, intellectual, humorous, or other socially acceptable context. For example, if S sees a figure in which human and animal features are combined, he can place his unrealistic response in social reality by noting that it looks like a creature that exists in mythology--e.g., a centaur. However, sometimes attempts to integrate a response by putting it in a social context are so forced, unconvincing and unsucessful that they receive low integration scores.

c. Expressive behavior which reflects anxiety or enjoyment about the response. The individual's attitude toward his response can indicate whether the response is experienced as a playful relaxation of controls or as a disruption of controls which elicits discomfort, fear, terror, blandness or false or hollow gaiety. The more unpleasant the affect, the lower the Defense Effectiveness.

d. Various other criteria are also used for judging integration--indications of defensiveness, evasion, or disruption, various kinds of rationalizations, failure to give expected features (e.g., movement or color), and slight changes in the form level when the unrealistic aspect of the response in introduced.

Only responses which have primary process features are scored for Defense Effectiveness. Defense Effectiveness is also rated on a five point scale ranging from plus 2 (effective) to minus 2 (ineffective). The summary score of Defense Effectiveness is the sum of all Defense Effectiveness ratings, divided by the number of responses on which a rating of Defense Effectiveness was made; that is, by the number of responses which had primary process elements. In addition to a total Defense Effectiveness score, Defense Effectiveness can be assessed separately for responses which have formal primary process features and for those which have content primary process features.

III. Adaptive Regression$_{re}$ $\frac{\Sigma(DD \times DE)}{R}$:

The Adaptive Regression score is a measure of the degree to which drive content and non-logical thinking are expressed in adaptive and appropriate form in the Rorschach protocol. It is obtained by multiplying, for each response, the Defense Demand (amount of primary process ranging from 1 to 5) by the Defense Effectiveness (-2 to +2) score. The product obtained for each response is summed for the entire Rorschach and divided by the number of responses in the record. Highest scores on this measure indicate extensive primary process material in the Rorschach which is meaningfully integrated; lowest scores suggest extensive primary process thinking in the Rorschach which is poorly integrated. Intermediate scores indicate smaller amounts of primary process thinking, with good integration receiving higher scores than poor integration. Intermediate scores could also indicate a large amount of unrealistic thinking, approximately evenly divided between effectively and poorly integrated.

RESULTS

Problem solving efficiency on the PSI is most accurately measured by the number of unnecessary questions an individual asks while solving the problem. This measure is obtained in a process analysis of the problem solving protocol. Earlier research (Blatt & Stein, 1959; John, 1957) indicates that it is the best measure of problem solving efficiency.[1]

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[1] The PSI apparatus also lends itself to examination and study of characteristics of the problem solving process (Blatt and Stein, 1959; John, 1957). These process characteristics include the clarity of the shift from Analysis to Synthesis, the balance between Unique and Redundant unnecessary questions, the relative length of the initial phase of the problem solving process and the rate at which questions were asked. Each of these process measures correlates highly significantly with number of unnecessary questions asked (efficiency). When efficiency is partialled out of these correlations, the correlations of these processes measures with external criteria approach zero.

Table 1 presents the correlations between problem solving efficiency (more unnecessary questions indicate lower efficiency) and traditional Rorschach measures. As indicated in Table 1, none of the traditional Rorschach measures has a highly significant relationship with problem solving efficiency. Only one Rorschach measure, the percent of responses wich animal content, shows a statistically significant correlation ($p. < .05$) with efficiency. There are trends ($p. < .10$) which suggest a possible relationship between efficiency and three other Rorschach dimensions; Color (Sum C/R), experience balance (M: Sum C) and the percentage of responses which, at least in part, were determined by a shading dimension. The more efficient problem solver tended to have less animal content, less color, less emphasis on color in the experience balance, and less shading determined responses. It should be stressed, however, that the magnitude of these correlations is low (the highest was .24) and generalizations about the relationships between cognitive efficiency and the personality variables expressed in these Rorschach dimensions are, therefore, limited.

TABLE 1

Correlations of PSI Inefficiency with Traditional Rorschach Dimension.

	Number of Unnecessary Questions Asked
R	-.07
M/R	-.16
ΣC/R	.19[a]
M/M+ΣC	-.19[a]
FC/#C responses	-.06
Ch + C'%	.19[a]
F%	-.10
F% extended	-.09
F+%	-.17
F+% extended	-.16
W%	.06
Dr%	.04
S%	-.14
H%	+.02
A%	.24[b]
# Popular	.03
P%	.17

a = $p < .10$ (1 tail)

b = $p < .05$ (1 tail)

Table 2 presents the reliability estimates obtained for the scoring categories of the Holt system; Defense Demand, Defense Effectiveness, and Adaptive Regression. Only a portion of the total sample of 50 was used for these reliability estimates. Twenty records, selected randomly, were scored by an independent judge and reliability estimates were obtained for each of the major categories.

TABLE 2

Reliability Estimates for Primary Process Analyses of Rorschach

	Formal Primary Process	Content Primary Process
Defense Demand	.92	.94
Defense Effectiveness	.72	.74
Adaptive Regression	.85	.85

Table 3 presents the correlations between problem solving efficiency and the analysis of Rorschach responses based on Holt's scoring of the Primary Process dimensions of Defense Demand, Defense Effectiveness, and Adaptive Regression. Defense Demand did not correlate significantly with problem solving efficiency; in fact, that correlation approached zero.

Defensive Effectiveness and Adaptive Regression on the other hand, both correlated significantly with efficiency on the PSI. Adaptive Regression, however, is highly correlated with Defense Effectiveness (in this study the correlation between the two measures is .69). Since Defense Effectiveness correlates somewhat higher with efficiency than does the more complicated Adaptive Regression measure, the major finding in these data is the relationship between Defense Effectiveness and cognitive efficiency.[2] While problem solving efficiency does not relate significantly to the amount of primary process in the Rorschach, efficient problem solvers do have greater capacity to modulate and effectively integrate their primary process thinking into adaptive and meaningful responses.[3]

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[2] One of the major aspects of the Defense Effectiveness score is the form level of the response. If form level is taken alone, instead of the more extensive Defense Effectiveness measure, form level correlates only .17 with efficiency. Though form level undoubtedly plays an important role in the Defense Effectiveness measure, other aspects of this score seem to contribute substantially to the significant relationship with efficiency.

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[3] Correlations between two problem solving process scores (A-S shift and Unique to Redundant ratio) and Rorschach scores for Defense Demand and Defense Effectiveness paralleled those found with overall efficiency. Significant correlations were found between these process scores and Defense Effectiveness (.34 and .32 respectively) and negligible correlations were found for the process scores and Amount of Primary Process (-.15 and .04). Again it would appear that Defense Effectiveness is the main Rorschach dimension that relates to performance in the problem solving task. _S_s with better ability to modulate and control primary process on the Rorschach have a higher A-S shift value and higher Unique to Redundant ratio. A-S shift and Unique to Redundant ratio correlate with efficiency ($r=.67$ and .34, respectively). Thus the findings relating problem solving process scores to Rorschach performance are not independent of the results for the overall efficiency score. In fact, when partial correlations are computed, with the number of unnecessary questions controlled, none of the correlations between problem solving process scores and Rorschach Defense Effectiveness scores is significant. The relationships between Defense Effectiveness and problem solving process measures seem to merely reflect the same relationship as with overall efficiency.

TABLE 3

Correlations Between PSI Inefficiency and Defense Demand, Defense Effectiveness, and Adaptive Regression

Total Primary Process Score	Number of Unnecessary Questions Asked
Defense Demand ($\Sigma DD/R$)	.05
Defense Effectiveness $\frac{(\Sigma DE)}{(RDD)}$	$-.46^{d}$
Adaptive Regression ($\Sigma DD \times DE/R$)	$-.40^{c}$
Total Number of Responses (R_t)	-.07
Number of Responses with Primary Process (R_p)	-.09

$c = p < .01$ (1 tail).

$d = p < .001$ (1 tail).

It should be noted that no significant correlations were found between efficiency and total number of Rorschach responses (R_t) or number of responses with primary process material (R_p). This suggests that the significant relationships found between problem solving efficiency and Defense Effectiveness and Adaptive Regression, are not a function of simple productivity on the Rorschach.

The analyses of the Rorschach dimensions of the Holt system considered in Table 3 are based on a combination of two types of primary process responses; responses which contain drive-related elements (content primary process), and those which contain deviations from logical, orderly thinking grounded in experience with the real world (formal primary process). Correlations of problem solving efficiency with content and formal primary process scores were also calculated separately and these results are shown in Table 4.

TABLE 4

Correlations Between PSI Inefficiency and Defense Demand, Defense Effectiveness, and Adaptive Regression For Content and Formal Primary Process Responses.

	Number of Unnecessary Questions
A. Content Primary Process	
Defense Demand	-.08
Defense Effectiveness	-.48^{d}
Adaptive Regression	-.46^{d}
Number of Responses	-.15
B. Formal Primary Process	
Defense Demand	.12
Defense Effectiveness	-.36^{c}
Adaptive Regression	-.23^{a}
Number of Responses	.08

a = $p < .10$, b = $p < .05$ (1 tail)

c = $p < .01$, d = $p < .001$ (1 tail)

The results for Content Defense Demand (Part A, Table 4) are highly comparable to those found for total Defense Demand (see Table 2). A non-significant correlation was found between efficiency and amount of content primary process. Both Defense Effectiveness and Adaptive Regression based on responses which had only content primary process correlated significantly with efficiency ($p < .001$).

As was found with Defense Demand in responses with Content Primary Process, efficiency also did not correlate significantly with Defense Demand in responses with Formal Primary Process elements. Defense Effectiveness for responses containing only formal Primary Process elements again correlated significantly with efficiency, but the correlation was slightly lower than that found between efficiency and Defense Effectiveness in responses with content primary process (Table 4, Part B). Also, the correlation between efficiency and the Adaptive Regression score for formal primary process responses just bordered on significance ($p < .10$), whereas, the Adaptive Regression score for content primary process was correlated to a highly significant degree with efficiency. Generally, correlations between effective modulation and control of primary process thinking and PSI efficiency tend to be slightly higher for responses with content primary process than for responses with formal primary process, but these differences are not statistically significant. It should also be noted, however, that attempts to measure Defense Effectiveness and Adaptive Regression for Content and Formal Primary Process separately are somewhat artificial. Content and formal manifestations of primary process are sometimes found in the same response, and since Defense Effectiveness scores are given for the entire response (not for the content or formal aspect of the response separately), the Defense Effectiveness and Adaptive Regression scores for content primary process responses may partially reflect the formal aspects of responses as well, and vice-versa. It is impossible to get separate scores for Defense Effectiveness and Adaptive Regression for content primary process completely independent of formal primary process dimensions.

In addition to a differentiation of content and formal primary process responses, Defense Demand scores are based on a number of types of responses. For example, content primary process can be further subdivided into specific libidinal and aggressive content categories. Formal primary process can also be divided into several different types of formal primary process manifestations. Though there were no significant relationships between problem solving efficiency and Defense Demand (content, formal or combined), an attempt was made to see if any relationships emerged between cognitive efficiency and the various subcategories or types of primary process responses. These findings are presented in Table 5.

TABLE 5

Correlations Between PSI Inefficiency and Percent of Various Types of Primary Process Responses.

Type of Primary Process Response[4]	Number of Unnecessary Questions Asked
Content	
Oral	.24[b]
Anal	-.05
Sexual	-.08
Exhibitionistic - Voyeuristic	-.17
Homosexual	-.21[a]
Aggressive	-.05
Formal	
Fusion	.24[b]
Composition	.12
Unusual Combination	-.02
Symbolism	-.07
Contradiction	.04
Verbal Peculiarities	.14
Pathological Signs	.22[a]

a = $p < .10$ (1 tail)   b = $p < .05$ (1 tail)

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[4] Holt also differentiates primitive (Level I) from more socialized (Level II) primary process responses. There were relatively few Level I responses in the present sample. The correlation between inefficiency and percent Level II oral responses, for example, is .25 as compared to .24 for total percent of oral responses.

There seems to be no consistent or highly significant relationship between any type of Primary Process response and Problem Solving efficiency. In prior research Holt (1966) and Von Holt et al. (1960) had found that the amount of oral content correlated to a significant and positive degree with cognitive efficiency. The results of the present study, however, suggest the reverse, that is, a negative relationship between efficiency and oral content. Von Holt et al. (1960) also report a significant and positive relationship between fusion responses and efficiency on the Hanfmann-Kasanin Concept Formation Test. The results of the present study tend to contradict these earlier results. It should be stressed, however, that the correlation with fusion responses is based on a very restricted range of such responses. The average number and percent of such responses in this sample was 0.3 and 1.1% respectively. With such a restricted range of scores, the correlations between image fusions and PSI efficiency may well be an artifact.

DISCUSSION

The data indicate that cognitive efficiency on a complex logical problem relates primarily to the degree to which an individual successfully integrates drive determined and/or unusual types of thinking into realistic and appropriate responses. The capacity to handle successfully the cognitive complexity presented by the PSI, seems to be clearly related to the ability to handle complexity introduced by impulses, drives, fantasies and unusual experiences. There seems to be no relationship, however, between cognitive efficiency on a complex logical task and the degree to which an individual's thinking contains different types of primary process elements. Cognitive efficiency on a complex logical problem such as the PSI does not seem to relate to differences in the amount of drive-laden or illogical thinking in a Rorschach. Efficient and inefficient problem-solvers seem to have approximately the same accessibility to primary process ideation, but they do differ markedly in the degree to which these primary process dimensions are integrated successfully into appropriate and realistic responses.

The capacity to handle and integrate drive representations and illogical and contradictory thoughts and perceptions into appropriate responses may be viewed as an indication of the individual's more general ability to deal with ambiguity and complexity. Drives and illogical, contradictory thoughts and wishes are a type of complexity which is basically internally determined. It is impressive that the capacity to integrate these primary process elements meaningfully, relates to the ability to handle and integrate externally determined complexity such as a complex logical problem. It may well be that the ever evolving capacity to experience and cope with emerging drives and attempts to resolve inaccurate and poorly articulated perceptions may relate to the desire and capacity to deal with complexity in more general form.

The PSI, as a complex logical problem, requires an understanding of a number of logical relationships and the integration of these relationships into the one sequential form or pattern which solves the problem. The solution and the logical relationships between the elements of the problem are predefined by the experimenter and the task for the subject is to understand these predefined relationships and integrate them into the prescribed pattern that solves the problem. The PSI does not require the individual to think in novel and unusual ways, to define a problem or to discover alternate or new solutions for an old problem. Because of its specific features, the PSI may assess only one aspect of creative thought, namely the capacity to integrate and elaborate a complex situation. It may not assess the capacity to think in novel and original ways, such as would be expected in the inspirational phase of the creative process (Kris, 1952) where novel, imaginative and inventive ideas are generated. It may be that Defense Demand (amount of primary process) in a Rorschach relates to this capacity for novel and original thought, while Defense Effectiveness relates more to the elaborative and integrative phase of the creative process where complex and novel ideas are integrated into fully articulated, socially appropriate and acceptable context.

The research thus far seems to suggest that the Holt system may be useful in the study of these various phases of the creative process. Efficiency on the PSI problems related significantly to the measure of Adaptive Regression (the composite measure of the extent of primary process thinking and the capacity to integrate this primary process thought into appropriate responses). Prior research has also found significant relationships between Adaptive Regression and creativity (Cohen, 1960), tolerance for ambiguity and dogmatism (Cohen, 1960), imaginative productiveness (Pine & Holt, 1960), religious conversion experiences (Allison, 1967) and, as will be reported in Chapter 4 of this report, to tolerance of unrealistic experiences. There are, however, interesting differences between these studies. In most of these studies, Defense Effectiveness alone, correlated as well with criterion measures as did the more complex composite measure of Adaptive Regression. One exception to this was the study by Allison (1967) which found that primarily greater Defense Demand (in addition to Adaptive Regression) differentiated divinity students who reported religious conversion experiences. Allison, however, did not have any evaluation of the relative success or failure of his subjects; his criterion was only the presence or absence of a conversion experience. It may be that the presence of drive-determined and unusual modes of thought are essential for the inspirational aspects of the creative process where the emphasis is upon imaginative, novel, and original experiences. But it is the Defense Effectiveness measure which may assess the capacity to place ambiguity, novelty, contradiction, and complexity into meaningful and appropriate form. In this regard, it should be noted that in the other studies using the Holt system, Defense Effectiveness (and not Defense Demand) related significantly to several measures of cognitive functioning, such as problem solving efficiency, tolerance for ambiguity and unrealistic experiences, and the ability to give creative TAT stories. The capacity to integrate illogical and drive determined experiences into appropriate and relevant form (Defense Effectiveness) may assess the integrative or elaborative phase of the creative process. Depending upon the specific nature of the criterion task, whether it requires primarily imagination and novelty or integration and synthesis, there may be differential relationships between the various Rorschach dimensions. Though Adaptive Regression may relate significantly to many of these criterion measures, the relationship may be determined primarily by differences in Defense Demand for the tasks which measure more imaginative and inventive dimensions as compared to more integrative functions which should relate to Defense Effectiveness.

Creative functioning, however, requires both capacities; the ability to suspend temporarily, logical considerations and to think in novel and possibly illogical and unrealistic ways, and the capacity to stop voluntarily this regressive mode of functioning and to return to more secondary process functioning where the novel thoughts are placed in appropriate and realistic contexts. It is the extent of the Defense Effectiveness which indicates the individual's capacity to integrate primitive modes of functioning, and this may enable us to differentiate less willful, more permanent and pathological regressive functioning from the more controlled, temporary and reversible regressive experience which has been conceptualized as "regression in the service of the ego" (Kris, 1952; Schafer, 1958). Truely creative functioning, however, demands both originality as well as integrative capacity and, therefore, in creativity one would expect both high Defense Demand and high Defense Effectiveness. The presence of both drive-laden illogical thinking and integrative capacity would be expressed in high Adaptive Regression scores. The Holt system which distinguishes between Defense Demand and Defense Effectiveness may permit the further differentiation of factors which relate to two major phases of the creative process.

The findings of the present study are important in at least one other regard. The correlations between PSI efficiency and conventional Rorschach scores were, at best, only suggestive. There is suggestion that efficient problem solvers tend to think in less stereotyped ways (lower A%), tend to have less affective freedom (lower Sum C and less Sum C in the Experience Balance) and less anxiety and depression (less shading). These findings, however, are of only marginal significance. In contrast, the results utilizing the Holt system were consistent and highly significant. This suggests that the conventional Rorschach categories are only a gross classification system which requires further differentiation, qualification and integration if meaningful data are to be obtained and if valid inferences are to be drawn. The Holt scores, particularly the Defense Effectiveness measure, are a quantification of the clinical process where the number of dimensions is simultaneously considered and integrated. The results of the present study, as well as a number of other recent studies utilizing the Holt system, suggest that many of the prior negative and inconclusive findings in research with the Rorschach may be a function of the mechanical use of a technique without the subtle, yet vital differentiations made in the clinical application of the Rorschach. The point is illustrated further in two subsequent studies (presented in the next chapter) which consider the relationship of cognitive efficiency and the Rorschach whole (W) response. The results of these studies clearly indicate that many of the inconclusive findings with the Rorschach may be a consequence of considering only unitary and undifferentiated dimensions on the Rorschach without allowing for important distinctions often made in the clinical inferential process. If one were to consider in the present study the relationship of the total number or percent of W responses to cognitive efficiency, on the PSI, this would be yet another finding in a long series of studies which have failed to confirm one of the most simple and obvious of Rorschach hypotheses; that the W response can represent the capacity for abstract and integrative functioning.

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CHAPTER III

Methodological Considerations in Rorschach Research: The W Response as an Expression of Abstractive and Integrative Strivings[1]

Study 1

The use of the Rorschach has been questioned both as a clinical instrument and as a research procedure because of seemingly frequent unsuccessful attempts to validate the assumptions underlying many aspects of the response process (Anastasi, 1961, p. 572). It is well accepted clinical axiom, however, that the Rorschach is only as sensitive as the clinician who is using it. Though precise scoring reflects the general structure and tone of a Rorschach protocol, the clinician must make further differentiations of the responses if he is going to achieve adequate interpretations. Yet it seems that much of the research on the Rorschach has been satisfied with testing hypotheses using only the general scoring categories without much further differentiation and elaboration of the basic scoring system to more fully express the particular phenomena of interest. This difficulty in Rorschach research is well illustrated by the numerous attempts to validate the Rorschach whole response (W) as an expression of intellectual strivings.

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[1] The two studies presented in this Chapter were conducted by Joel Allison and Sidney J. Blatt and were published in the Journal of Projective Techniques and Personality Assessment, 1963, 27, 269-278 and 1964, 28, 256-260.

It is generally agreed in the Rorschach literature that the capacity to integrate the diverse elements of the inkblots into a perceptual-associative response which encompasses the entire stimulus is an important indicator of "abstracting, surveying, and integrating ability" (Rapaport, et al., 1945). Research attempts to substantiate the relationship of W to synthetic ability have generally followed the pattern of correlating the number and/or the percent of W response in a record with estimates of intelligence obtained from standard intelligence tests (Abrams, 1955; Altus and Thompson, 1949; Armitage et al., 1955; Beck, 1932; Hertz, 1935; Lotsof, 1953; Sarason, 1950; Taulbee, 1955; Wittenborn, 1949; Wysocki, 1957). A variety of such studies have been carried out on patient populations, college students, and mental defectives. For the most part, the Wechsler-Bellevue has served as the criterion, but other measures of verbal and non-verbal intelligence have been used as well. In addition to the fact that there are an insufficient number of overlapping studies to evaluate the results in terms of type of Ss or type of IQ measure, one finds at the present time a prevalent picture of contradictory findings. Correlations as low as .008 and .04 and as high as .47 and .59 are reported. A close look at the studies reveals that the conflicting results seem to stem from the tendency to replace psychological thinking by scores (Schafer, 1949) without adequate consideration of the theoretical rationale underlying the test scores and whether the test scores represent the psychological processes which are of interest in the investigation.

In the research on the validation of W responses as synthetic ability most studies are clearly deficient in either of two respects. One deficiency involves the frequent failure to take into account the quality of the whole responses. Rather than differentiating types and levels of whole responses, their sheer quantity, whether number of percent, has been considered. Sarason (1954), in discussing a study in which a negative correlation was found between W responses and the M.A. of mental defectives, concludes that the Ws' of defectives are rather gross and of low level and reflect their concrete conceptualization of the inkblot. Sarason stresses the importance of considering the quality of the W response. A study by Wishner (1948) brings into focus even more sharply the necessity of attending to the quality of the W responses, for by ignoring quality of W, Wishner obtained a correlation of only .008 between the number of Ws and IQ. However, when he related the number of W on only the "more complex cards" (III, IX, X) with IQ, a clear relationship of the ability to produce Ws with IQ was shown (r = .59). Though Wishner's judgment about the complexity of these cards may be correct, it is not certain that the responses themselves were complex and accurately perceived.

In another study (Bialik and Hamlin, 1954) judges were able to make valid estimates of intelligence based on a sample of 5 W responses given by each S (r = .68). Although no attempt was made to specify the bases for the judgments, it is likely that configurational aspects of the responses were taken into account. Wishner's findings and those of Bialik and Hamlin are not surprising for most authors have, in one form or another, indicated the importance of assessing the accuracy or form level of the response as well as the degree of cognitive complexity that enters into the response process. The static conceptualization in most research studies of the W response as a simple end product of behavior contrasts markedly with the theoretical attempts to specify the subtle integrative and synthetic process that can be involved in forming a W response.

Though some of the difficulty in the attempts to study the theoretical assumptions underlying the interpretation of the W response has been due to a failure to differentiate types and levels of W responses, another major source of error has been the tendency to equate overall intelligence with the capacity for abstraction and synthesis. Too frequently, the operational yet global, unarticulated definition of the IQ score has been chosen to reflect such processes involved in whole responses as "intellectual aspects and strivings," or "willingness to produce complicated performance," or "an emphasis on the higher forms of mental activity." In fact, when the various theoretical statements about W responses are taken into account, there is little reason to think that the W response is related to IQ in any simple manner. Rorschach (1942), for example, claimed that the W response only reflects a component of intelligence, i.e., the "availability of associations" and the "energy of associative activity." Part of Piotrowski's (1957) formulation of W has similarly included a view of W as reflecting "potential energy output." Though the assumption that IQ reflects intellectual strivings or the energy of associative activity may be valid across a wide range of IQ scores, the inference seems less tenable within a limited range of intelligence. In other words, while a certain basal intelligence is probably needed to give Ws of a certain level of complexity, other factors seem to enter into W productions, namely S's capacity to utilize his intellectual assets in terms of integrative and synthetic activity. Ss equal in IQ may differ in the extent to which they possess intellectual or integrative strivings.

Some efforts to get beyond a preoccupation with the IQ score and to tap the specific psychological processes which underlie the production of a W response have been reported. Holzberg and Belmont (1952), for example, hypothesized that the Similarities subtest of the Wechsler-Bellevue, like a W response, entails "conceptualized thinking and an abstract attitude." They found, however, only a .08 correlation between Similarities and W percent. Wishner also obtained essentially neglibible findings between Similarities and both number and percent of W (r with number of W was .186 and with percent of W was -.109). Taulbee (1955), on the other hand, found a significant correlation (value unreported) between Similarities and W percent. In another approach, Sinnett and Roberts (1956) related S's ability to form generalizations from reading paragraphs to number and percent W. Positive findings were obtained for their first sample but they were unable to cross-validate this finding. Although these studies have emphasized psychological processes rather than scores, they have failed to take into account the variation in complexity of W responses. The puzzling and inconclusive findings in the research on whole responses are not surprising when one considers the disregard of qualitative variations in whole responses and also the reification of the IQ.

It is the goal of the present study to attend to both the level of complexity of W responses and to the psychological processes which lead to the production of W responses. The major hypothesis of this study is that the production of more highly complex and articulated W responses will relate to superior performance on a problem solving task which requires abstraction and integration.

METHOD

To study the level of configural complexity and reality articulation of Rorschach W responses, a scoring system developed by Friedman (1953) was used. This analysis of W responses is based on Werner's Developmental Theory and has been summarized by Hemmendinger in a recent article (1960). In this system the W responses to the Rorschach are evaluated along a seven point scale ranging from diffuse and global responses to highly articulated and differentiated ones.

Wa: An amorphous response in which the shape of the blot plays no determinable role. The response to the entire card is based solely on chromatic or achromatic aspects of the blot and, in customary scoring procedure, no form element is included in the score.

Wv: A vague response in which there is a diffuse general impression of the blot. Although some form element is present, it is of such an unspecific nature that almost any perceptual form is adequate to encompass the content.

W-: A response in which the content produced requires a definite specific form which, however, is not provided by the blot.

DW: Rorschach's confabulatory response, in which a "single detail, more or less clearly perceived, is used as the basis for the interpretation of the whole picture, giving very little consideration to the other parts of the picture."

Wm: A mediocre response in which the gross outline and articulation of an unbroken blot are taken into account so the content matches the blot.

W+: A response in which all the discrete portions of a broken blot are combined into a unifying whole, and in which the specific form implied in the content matches the blot.

W++: A response in which a unitary blot is perceptually articulated and then reintegrated into a well-differentiated unifying whole, the specific form of which matches the blot.

Though the usefulness of this Rorschach analysis has been demonstrated in studies of psychopathology and in developmental studies (Hemmendinger, 1960), no attempt has been made to study its relationship with level of cognitive efficiency or intelligence in a normal adult sample.

Two judges independently scored 26 Rorschach protocols without knowledge of the problem solving performance of the Ss. A reliability estimate of the W scoring was obtained for the 26 protocols scored and the judges agreed on

88% of the ratings made on these records. Discrepancies in scoring were resolved in a discussion between the two judges.

The John-Rimoldi Problem Solving and Information Apparatus (PSI) was selected as a cognitive task for the study because it permits a sequential analysis of the problem solving process. The level of problem solving efficiency, therefore, is based on the characteristics of the performance rather than on some external measure such as time to solution or number correct. Furthermore, analytic and synthetic modes are an integral aspect of the characteristics of performance on the PSI. John reports "a clear correspondence between effectiveness on the PSI and the ability to do well on examination sections (of college comprehensive examinations) which require analysis and synthesis" (John, 1957). The PSI was also selected as the cognitive task for this study because prior research indicates an impressive relationship between problem solving efficiency on the PSI and independent estimates of cognitive efficiency. John (1957) reports that PSI efficiency was a better correlate of comprehensive examination grades at the University of Chicago than either ACE scores or prior college grades. Blatt (1962) reports a significant relationship ($p < .01$) between PSI efficiency and college grades. The PSI appears to be equally as effective in predicting college performance as a regression equation based on college board examinations, high school grades and quality of the high school. PSI performance also tends to have a significant relationship to estimates of research creativity of Ph.D. scientists (Blatt and Stein, 1959). A detailed description of the PSI apparatus has been presented earlier in Chapter II.

Ss: Twenty-six male graduate students who had volunteered to take part in a study of problem solving served as Ss. Ss were paid for participation in the study which was comprised of two sessions, each three hours in length. In the first testing session, all Ss were given the three standard problems of the John-Rimoldi PSI: a demonstration problem, a practice problem and the experimental problem (Blatt and Stein, 1959). In the second testing session, approximately one month after the problem solving session, Ss were given the Rorschach and the Raven Advanced Progressive Matrices. The Raven Matrices was selected as an intelligence test measure for the present study because it reportedly discriminates well at advanced levels and because it seems to closely resemble the perceptual-cognitive and non-verbal characteristics of the PSI. The relationship between W responses on the Rorschach and the scores on the Raven Matrices were also examined.

RESULTS

Table 1 presents the correlations of traditional Rorschach measures of number and percent of Total W with PSI efficiency and with scores on the Raven Matrices. Though all correlations are in a positive direction and suggestive, none reaches statistical significance.

Table 2 presents the correlations between number and percent of each type of W response and the criteria (PSI efficiency and Raven). Since there were relatively few responses at the extreme ends of the W scale, W++ and W+ were combined into a single measure, as were Wv and Wa. In the first portion of Table 2, number of each type of W is correlated with PSI and Raven Matrices. The large number of ties in these categories, however, made correlational procedures questionable. Following a procedure developed by Abelson & Jones (1962) Ss were paired into doublets, that is, the scores for subjects 1 and 2 were combined and treated as a single score and this was done for all subsequent pairs. This reduces the N by half but avoids the issue of an inordinate number of ties. The significant correlation of number of W++ and W+ with problem solving efficiency clearly supports the hypothesis that the production of clearly articulated Ws relates to problem solving efficiency.

Since there is frequent controversy about controlling for response productivity (Holtzman, 1961) the data were also analysed for percent of each type of W in the record. An inordinate number of ties did not occur when using percent scores and therefore there was no need to use the pairing procedure and the N could remain at 26. Percent scores give essentially the same results as absolute number with the only significant finding being the relationship between problem solving efficiency and percent W++ and W+.[2]

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[2] The N for this study was extended to 50. The results based on the last half of the sample (N = 24) was similar to the first half of the sample presented above. The correlations of problem solving efficiency and types of W responses for the entire sample of 50 are as follows:

#W = -.03, #W/R = .06, W++&W+/R= .40 ($p < .01$),

Wm/R = -.10, W-/R = -.21, Wv/R = .02, Wa/R = -.04

TABLE 1

Correlations of Total Number and Percent of Whole Responses With PSI Efficiency and With Raven Matrices

N = 26	Problem Solving Efficiency	Raven Matrices
Number of Total W.....	.244	.272
Percentage of W (W/R)	.177	.262

TABLE 2

Correlations Between Number and Percent of Each Type of Whole Response and Problem Solving Efficiency and Raven Matrices

N = 13	Problem Solving Efficiency	Raven Matrices
#W+ and W++...........	.838**	.170
#Wm....................	–.287	.228
#W–....................	–.063	.357
#Wv and Wa............	.240	.235
N = 26		
W++ and W+/R..........	.462**	.212
Wm/R..................	–.271	.021
W–/R..................	–.212	.318
Wv and Wa/R...........	.112	.011

** = .01

Thus, the results show strong support for the hypotheses. Neither the absolute number nor the percent of whole responses related to problem solving efficiency. When cognitively complex and accurately articulated whole responses were differentiated from other types of whole responses, however, an impressive relationship was found between the superior whole productions and problem solving efficiency. No significant relationships were found between intelligence and either number or percent of whole responses. Even when the quality of the whole responses is considered, a non-significant relationship emerges. A problem solving situation appears to be a more adequate measure of the willingness and capacity to cope with complex abstract and synthetic situations than an IQ estimate, particularly in a sample with a restricted IQ range. The lack of any significant relationship between W production and the Raven Matrices is consistent with the fact that Raven Matrices correlated only .09 with problem solving efficiency.

DISCUSSION

The significant relationship between level of complexity of the W responses and problem solving efficiency in the present study clearly indicates that W responses in the

Rorschach can offer important information about the capacity for complex analytic and synthetic thought. More efficient problem solvers gave a significantly greater number and percentage of highly complex and accurately articulated W responses than did inefficient _S_s. Though the Raven Matrices also had a consistently positive relationship with the production of the higher level W responses, these relationships did not reach statistical significance.

As indicated earlier, intelligence is only one facet of complex abstract and synthetic strivings and a problem solving situation appears to be a more adequate measure of the willingness and capacity to cope with complex cognitive situations than an IQ estimate. The suggestive, though insignificant findings with the Raven Matrices seem to support the contention that beyond a certain level, intelligence bears little relationship to complex cognitive functioning. This possibility has support in the research on creativity where, with restricted samples, IQ appears to have little relationship to ratings of creativity (MacKinnon, 1962; Meer and Stein, 1955).

In addition to the highly significant relationship between the production of W++ and W+ and problem solving efficiency it is interesting to note that efficient and inefficient problem solvers did not differ in the number of Ws in the other categories. The Friedman scoring system attempts to evaluate a range of percepts from those that are amorphous through those which are articulated but inaccurate and/or gross and culminating in complex, articulated percepts. This analysis of W responses, therefore, assesses responses along two major dimensions: the degree of cognitive complexity of the whole response and the degree and accuracy of reality testing (F+ or F-). The more diffuse, amorphous and arbitrary percepts reflect the less adaptive, less reality tested, more affect or drive dominated processes. The presence of these primitive responses in the Rorschachs of more efficient problem solvers is in accord with Werner's developmental theory (1957) and with psychoanalytic ego theory (Gill, 1959). In both theories the process of ego development is viewed as a gradual sharpening and stabilizing of reality perception while the earlier primitive forms of thought are never completely surrendered and are expressed in daydreams, imaginative play and in creative endeavors. As reality ties are sufficiently stabilized the individual can permit himself regressive excursions and the relaxing of ego controls with the comfort and assurance that ego controls can be re-established. If these more primitive responses and tendencies are balanced by successful adaptive endeavors, the less adaptive features can be taken to indicate the flexibility of efficient Ss. The concept of regression in the service of the ego (Kris, 1952; Schafer, 1958) suggests that the capacity for creativity and adaptive endeavors more generally rests with this ability to integrate primitive, undifferentiated experiences.

The Friedman scoring system represents an important step in attempting to further refine Rorschach scoring by calling attention to those aspects of the response process which frequently influence clinical inferences. All too frequently, research with the Rorschach has utilized the barest and simplest of Rorschach scoring and neglected the fact that such scores are only simple notations or summary systems which the clinician more fully elaborates as he studies the protocol. If the Rorschach is to provide meaningful research data, the scoring systems must evolve from the phenomena of interest and must have sufficient differentiation and articulation in order to reflect these processes. There have been a number of attempts in this direction beginning with Rapaport's (1945) discrimination of W responses along a four-point scale of W+, Wo, W-, and W vague. The Friedman system (1953) is essentially an extension of Rapaport's system into a seven-point scale. More recently, Mayman (1962) has been attempting to extend the Rapaport differentiation to all responses by scoring the form level in these various categories. Holt's primary process scoring system (1960) is another extensive attempt to quantify clinical sensitivity and to give research with the Rorschach the subtle and vital differentiations that are made by the clinician. It seems likely that the Rorschach can be a more valuable research instrument if conventional scoring categories are treated as only gross category systems that need elaboration, refinement and revision depending upon the phenomena which are of interest in the study.

Study II

The preceeding study demonstrated that the puzzling and contradictory findings in this research stem from both the failure to differentiate type and quality of W responses and from the inappropriate choice of the globally defined IQ score as the validating criterion with samples which have a restricted range of intelligence. In a sample of male graduate students no relationships were found between intelligence, as measured by the Raven Progressive Matrices (Adv. form), and either number or percent of Rorschach W responses. Even when the quality of W responses was differentiated according to the Friedman (1953) scoring system, intelligence and W responses were not found to correlate to a significant degree. In this study, furthermore, W production was also compared with problem solving efficiency on a complex task. Number and percent of W responses did not relate to problem solving efficiency. However, when cognitively complex and accurately articulated W responses were differentiated from other types of W responses (Friedman, 1953), a highly significant positive relationship was found between W production and problem solving efficiency. This finding clearly showed the importance of distinguishing among W responses when attempting to validate the processes underlying them.

The finding that problem solving efficiency and not scores on the Raven Matrices significantly related to the production of complex and well articulated W responses suggests that the production of W may be more intimately connected with the energy of associative activity and intellectual strivings than with intellectual capacity per se (Rorschach, 1951 [1942]).

The lack of any positive relationships between quality of W responses and the Raven Matrices could be interpreted as supporting earlier research reports that W production is independent of intelligence. However, these findings could also have been a function of the relative intellectual homogeneity of the graduate student sample. Research studies of creativity have emphasized that beyond a certain level of intelligence, IQ appears to bear little relationship to creativity (MacKinnon, 1962; Meir and Stein, 1955). Similarly, with a sample of highly intelligent subjects, the degree of their intellectual strivings and willingness to engage in superior abstract and synthetic thinking may be independent of intelligence. Across a wide range, however, intelligence might relate to W production, particuto the higher level responses. The purpose of the present study is to investigate more systematically the relationship of Whole responses to intelligence by examining the qualitative features of W responses over a broad range of IQ levels. It is hypothesized that a significant positive relationship between Whole responses and IQ will emerge when the qualitative features of the Whole responses are considered. In other words, it is the capacity to produce more complex and integrated Ws which should relate to intelligence.

METHOD

Ss. In order to ensure a wide range of IQ, it was decided that five Ss would be chosen in each of eight ten-point IQ intervals ranging from 60-70 to 130-140. The 40 Ss were selected from clinical files primarily on the basis of the WAIS Total IQs. Clearly psychotic and organic patients were excluded from the sample because of the special nature of their cognitive impairments and Ss whose Total, Verbal and Performance IQs showed marked discrepancies were also excluded. Other than the above restrictions, no attempt was made to control such factors as diagnostic classification, length of illness and in or out-patient status. A variety of diagnostic classifications were thus included, consisting predominantly of hysterics, mixed neurotics, character disorders, depressives, and those with borderline or mentally defective intelligence. Nine were hospitalized and 31 were out-patients. All Ss had received a battery of psychological tests including the Rorschach, WAIS, and TAT. The resulting sample consisted of 29 females and 11 males with the average female age 28.6 and the average male age 26.9. There were no significant correlations between age and IQ level either for the total sample or for males and females considered separately. The higher proportion of female Ss in the sample reflects the composition of our patient population. Nevertheless, even with the imbalance in the number of male and female Ss it was possible to analyze the data for each sex separately.

In order to investigate the level of configurational complexity and reality articulation of the W responses, a scoring system developed by Friedman (1953) and derived from Werner's developmental theory was used. Through this means, Rorschach percepts are evaulated along a seven-point scale ranging from diffuse and global responses to highly articulated and differentiated ones. The final assessment of each percept is based on both the level of cognitive complexity and the degree and accuracy of adherence to reality (F+ or F-). A summary of this scoring system was presented in the prior study reported in this chapter.

A judge scored all the Rorschach W responses without awareness of Ss' IQ scores, age, sex, or diagnostic classification. The reliability of scoring the W responses with the Friedman system in an earlier study had been sufficiently high (88% agreement) so that an additional reliability estimate was not obtained.

RESULTS

The number and percent of each type of W response was correlated with IQ and in all cases, rank order correlations were computed (Siegel, 1956). Table 3 presents the correlations between number of W responses and IQ. The findings indicate that total number of W correlates with IQ to a highly significant degree ($p < .01$), both for the total sample and for female Ss. In examining the various types of W responses, it is apparent that it is the higher levels of W responses (W++, W+, Wm), rather than the more diffuse or arbitary Whole responses, which have the striking relationship with intelligence. More intelligent Ss, then, give a significantly greater number of W responses of a higher quality than do less intelligent Ss.

However, the interpretation of these findings must be tempered somewhat. Since IQ is also highly correlated (.680) with total number of responses (R) for the total sample, and particularly for women, the relationship between intelligence and the total number of W responses may be a function of the generally greater response productivity of more intelligent Ss.

TABLE 3

Correlations Between Number of Each Type
Of Whole Response and Intelligence

	#W	#W++ & W+	#Wm	#W-	#Wv & Wa	R
Males (N=11)	.51	.74**	.37	.10	.24	.28
Females (N=29)	.53	.77**	.57**	.06	.17	.79**
Total (N=40)	.54**	.87a**	.74a**	.08a	.26a	.68**

[a] Due to the large number of ties in these scores, adjacent Ss were paired into doublets (Abelson & Jones, 1962) and their combined scores were treated as a single score. This reduced the N by half.

* $p < .05$
**$p < .01$

Note: p values for correlations between IQ and number W++ and + are presented for a one-tailed test. All other p values are for a two-tailed test.

The data, therefore, were also analyzed in terms of percentages of total R. As indicated in Table 4, the percent of W responses in a record (W/R) does not relate significantly to intelligence. This can be taken to mean that the significant relationship between total number of W and IQ may be, in part, a function of the greater response productivity of more intelligent Ss. However, even when the response productivity is taken into account, percent of W++ and W+ still relates significantly to intelligence. The significant relationship between number of Wm and intelligence, however, is no longer obtained for the total sample when percentage scores are utilized.

In examining the findings for the total sample, the results indicate strong support for the hypothesis of the present study. Although the total number of W responses is clearly related to intelligence, this relationship seems in part to stem from the greater response productivity of more intelligent Ss. It is only with W response on the highest level (W++ and W+) that the relationship between W production and IQ is maintained even when response productivity is taken into account.

The relationship between W responses and IQ appears different in some for males and females. For male Ss, no significant relationships emerged between lower level W responses and IQ. But among females, on the other hand, more intelligent Ss tended to give fewer lower level W responses. Although there is this difference between males and females in how their poorer quality W responses relate to IQ, the important finding of a highly significant positive correlation between IQ and the percent of W++ and W+ responses exists both for females as well as males.

TABLE 4

Correlations Between Percent of Each Type of Whole Response and Intelligence

	%W (W/R)	%W++ & W+ $\left(\frac{W{+}{+} \ \& \ W{+}}{R}\right)$	%Wm (Wm/R)	%W- (W-/R)	%Wv & Wa $\left(\frac{Wv \ \& \ Wa}{R}\right)$
Males (N=11)	.05	.62*	-.10	-.17	.12
Females (N=29)	-.14	.52**	-.44*	-.28	-.41*
Total (N=40)[a]	-.08	.57**	-.29	-.24	-.15

[a] With the computation of percent scores there were no longer a large number of ties. There was no need, therefore, to use the pairing procedure and N remains at 40 throughout.

* $p < .05$
** $p < .01$

Note: P values for the correlations between IQ and number W++ and + are presented for a one-tailed test. All other p values are presented for a two-tailed test.

DISCUSSION

The consistently significant relationship between the highest levels of W responses and intelligence seen in the present study indicates that W responses can offer valid estimates of intellectual level. More intelligent Ss had a significantly higher number and percent of highly complex and accurately articulated W responses than did less intelligent Ss. This finding is consistent with the earlier study presented in this chapter which found that problem solving efficiency related primarily to the capacity to give responses at the highest level of cognitive development. In this prior study, however, no significant relationships were found between intelligence as measured by the Raven Advanced Progressive Matrices and W responses at any level. The results of the present study suggest that these prior findings were a function of the relative intellectual homogeneity of the sample of the prior study (male graduate students). When considered across a wide range, intelligence clearly relates to the capacity to give W responses at the higher levels of cognitive development. The findings of the present study, along with the earlier study's finding that higher level W responses and problem solving efficiency are related, serve to emphasize the importance of viewing Rorschach responses from a qualitative point of view, i.e., from the point of view of their configurational complexity and degree of adherence to reality.

In the earlier study (with male _S_s), no significant relationships among the more perceptually primitive W responses and intelligence were found. Similarly, in the present study the results for the total sample indicate that the presence of more differentiated, more articulated responses in persons with high IQs does not preclude the existence of other more simple or formally arbitrary W responses. This finding is in accord with developmental cognitive theories (Piaget, 1952; Werner, 1940; Gill, 1959), which perceive development as proceeding in the direction of advanced stages of organization and differentiation but always more or less retaining the more primitive modes.

The results for males and females, however, suggest that the above finding is less true for females than for males. More intelligent females appear to show less responsivity to developmentally more primitive experience, at least to the extent that such experience can be estimated in a qualitative analysis of Rorschach W responses.

Finally the two studies in this chapter, by differentiating types and levels of W responses, hope to emphasize the importance of including in research those aspects of Rorschach responses which go beyond a simple sign approach. Research with the Rorschach and with clinical psychological tests in general might be made considerably more meaningful by exploring theoretical conceptions as they are mirrored in processes instead of merely totaling the sums of conventional scoring categories and attempting to relate them to imprecise criteria.

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CHAPTER IV

Personality Correlates of Tolerance For Unrealistic Experiences[1]

The concept of "tolerance for unrealistic experiences" (TUE) was first proposed by Klein and Schlesinger (1951) to describe a person's capacity to perceive in ways which contradict usual modes of perception. The phi phenomenon is an example of one task which they used to assess TUE. In this task S was shown two stimuli and told that they would be flashed in sequence. Perception of a single moving object directly contradicted S's knowledge that in reality two stationary figures were being flashed in sequence, and hence ability to see phi was considered an appropriate measure of TUE.

TUE seems to play an important role in personality functioning. For example, the ability to perceive in unusual and unrealistic ways has been discussed in a number of theories as a necessary aspect in the early stages of creativity (Kris, 1952; Schactel, 1959). Inability to perceive unusual and unrealistic experiences has been linked with rigidity in social beliefs (Frenkel-Brunswik, 1949), and with "neurosis" (Hamilton, 1960). The present study investigates personality factors which relate to the capacity to perceive the unrealistic or unusual phenomena involved in TUE tasks.

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[1] Dr. Alan Feirstein conducted this experiment and prepared this chapter which is currently in press in the Journal of Consulting Psychology.

Two previous studies (Klein and Schlesinger, 1951; Klein, Gardner, and Schlesinger, 1962) investigated the relationship between unrealistic thinking on the Rorschach test and TUE. The prediction was that people who showed high TUE on the other perceptual tasks would engage in a large amount of fantasy and unrealistic thinking on the Rorschach test. These two studies, however, did not investigate a variable that psychoanalytic theory suggests is of crucial importance in determining TUE -- that is, the capacity of the subject to give unrealistic material that is integrated with more usual and logical elements (Kris, 1952). Indeed a preliminary study for the present research suggested that amount of unrealistic material given on the Rorschach test did not relate to performance on TUE tasks unless the integration of such material with more realistic thinking was also taken into account. The present study was designed to investigate the relationship between TUE and quantified measures of amount and integration of unrealistic material on the Rorschach and several other tests.

According to psychoanalytic theory, percepts and thoughts which deviate from usual, realistic experience with the world are potentially anxiety arousing (Freud, 1959). If the unusual or unrealistic experience is integrated with more logical, coherent, and realistic thought, anxiety does not occur (Kris, 1952). The integration of unrealistic experiences with more rational thought makes coherent what otherwise might have been an anxiety arousing experience, and allows the person to communicate his experience to others.

Some people, in fact, seem to experience a sense of accomplishment and mastery in being able to engage in integrated unrealistic experiences (Kris, 1952). This kind of person enjoys and seeks unrealistic experiences, and should show high TUE. At the other extreme, the person who cannot integrate unrealistic experiences will be anxious about such experiences. For this reason he will strive for only realistic, logical, and coherent experiences, and therefore where reality is clearly known he should maintain realistic thoughts and percepts. Since the reality of the situation is made clear and explicit in the TUE tasks, he would be expected to show low TUE. Avoidance of unrealistic ideation is not always possible for this person, and particularly when reality is not clearly structured (as in projective tests) unintegrated and unrealistic experiences will be expected to appear. Between these two extremes is the person whose integration of unrealistic experiences is adequate, but who does not enjoy or seek such experiences. He should show moderate TUE.

In the present study four tasks were used to assess TUE -- the phi phenomenon, reversible figures, aniseikonic lenses, and stimulus incongruity. Three tasks were used to assess amount and integration of unrealistic experiences -- the Rorschach test, a Word-Association test, and an Art-Preferences test for unrealistic paintings. The first purpose of the present study is to test the theoretical expectations that people who engage in large amounts of well integrated unrealistic thinking on these three tasks would show high TUE, while people who engage in large amounts of poorly integrated unrealistic thinking would show low TUE. Moderate TUE was expected in people with small amounts of unrealistic thinking. These expectations will be specified in more operational terms when these tasks are discussed in the method section.

The second purpose of the present study is to see whether individual differences in TUE relate to differences in the handling of drives. One of the earliest and most important conflicts faced by the individual is that between the expression of drives (e.g., sexual or aggressive impulses) and restrictions against such expression (Fenichel, 1945). A central concept in psychoanalytic theory is that the way a person deals with drive conflict determines general modes of resolving other conflicts (Gill, 1959). This concept was tested in the present study by investigating whether the individual's mode of handling the conflict between drives and restrictions related to the manner in which he dealt with the conflict aroused by unrealistic perceptual experiences (TUE).

Like unrealistic thinking, drive-related thinking can be anxiety arousing. If the drive-related thought is integrated with more socially acceptable and understandable thought, anxiety does not occur. For some people the sense of accomplishment and mastery at being able to engage in integrated drive-related thinking allows the person to enjoy and seek situations which contain drive-related material. He should also tend to enjoy and seek unusual and unrealistic perceptions (high TUE). The person who cannot integrate drive-related thinking will experience anxiety about such thinking and should try to avoid it. He should also avoid the conflict aroused by external events that contradict usual modes of perception (low TUE). Control of drive-related thinking is not always possible for this person, however, and particularly in unstructured situations (e.g., projective tests) unintegrated drive-related thinking will be expected to appear. The person who neither seeks nor avoids drive-related material should show moderate TUE.

Drive-related thinking was assessed with the Rorschach test and an Art-Preference test for drive-related Paintings. The expectations were that people who engaged in large amounts of well integrated drive-related thinking on these two tasks would show high TUE, while people who engaged in large amounts of poorly integrated drive-related thinking would show low TUE. Moderate TUE was expected in people with small amounts of drive-related thinking.

Method

Twenty male graduate students obtained from the university employment service served as paid Ss in this experiment. Subjects were seen individually in four sessions, with total testing time approximately 12 hours. In the first session a test of problem solving was administered -- these data do not pertain to the present study. In the second session the Rorschach test was given and later scored by an examiner who had no knowledge of S̲s performance on the other tasks. In the third session perceptual tasks designed to measure TUE were administered. Subjects took Wild's Word-Association test (1964) and an Art-Preference test in the fourth session.

Measurement of TUE

Four tasks were used to assess TUE. The first three to be described were used previously in studies of TUE (Hamilton, 1957; Klein, Gardner and Schlesinger, 1962). The fourth, a modification of a technique suggested by Haber (1964), has not been used in previous studies, but was included here because of its relevance to the concept of TUE.

Phi phenomenon

In this task S̲ was shown two stimuli and told that they would be flashed in sequence. Subject's ability to see one object moving despite his knowledge that two stationary figures were being presented was one measure that was used to assess TUE.

Five series were run with each of two pairs of stimuli. In each series the experimenter gradually decreased the separation time between the two flashes of the stimulus figures until S̲ reported seeing one figure moving rather than two separate figures. The measure of TUE was the total number of times S̲ reported movement for each of the two pairs of stimulus figures.

The typical reversible figure can be seen in either of two phases. With steady viewing, these phases alternate. The number of alternations seen in a fixed time is an appropriate measure of TUE because it involves seeing two different forms in the same stimulus. In addition to number of reversals, a second measure of TUE that was obtained from one of the reversible figures was the percentage of time S viewed the figure in the phase which conformed less to everyday experiences.

A 2 x 4 inch Schroeder staircase provided the figure where one phase (a staircase coming from the ceiling) conformed less to everyday experience than the other phase (an upright staircase). The second figure, a "double-cross," was three inches in diameter, with four black and four white portions.

There were two 30 sec. trials with each figure, in which the subject viewed the figure steadily and indicated reversals by depressing or raising a telegraph key that was connected to an electric timer. Scores were: (a) the number of reversals for the cross (b) the number for the stairs (c) the unusual phase time for the stairs.

Aniseikonic lenses

Subjects were given aniseikonic lenses to wear. Viewed through these lenses the room appears distorted to most people.

There are wide individual differences in the speed with which subjects recognize distortion, and in the amount of distortion observed, and these seem to be appropriate measures of TUE. Tolerant Ss should recognize the distortion quickly and see a large amount of distortion. Intolerant Ss should maintain the customary shape of the room, possibly by attending to monocular cues that help maintain it.

Two per cent meridional sized lenses were used, with axes positioned obliquely at 45° in the right eye and 135° in the left. In this position the lenses make the floor of the room appear to slant down from the subject, and the wall in front to slant away and to assume a trapazoidal shape, wide at the top and narrow at the bottom. S was asked to look around the room and describe in detail any differences from the usual appearance of the room. After five minutes S was asked to adjust a black wooden rod to the vertical, with angle of deviation from the true vertical serving as the measure of amount of distortion.

Scores for the aniseikonic lenses were: (a) Speed with which distortion was recognized; and (b) Average angle of deviation of the rod from the true vertical.

Stimulus incongruity

In this task pictures were employed in which a part of the scene was incongruous with respect to the total context of the picture. A subject's ability to recognize the unusual, incongruous element seems an appropriate measure of TUE.

Pictures were flashed tachistoscopically, with exposure time increasing on every trial until S recognized the incongruity in the picture. Two pictures were used. One showed two basketball players with one of the players dribbling a head, superimposed in a circle, in place of a basketball. The second picture showed a dock scene with men loading and unloading cargo. The incongruous element was a girl on the dock dressed in a striped prisoner's outfit. She was lying on her back with her feet in the air, doing "bicycle pedaling" exercises.

The datum used for each of the two pictures was the speed (reciprocal of the number of seconds) with which the incongruous item was recognized.

Total measure of TUE

All nine measures of TUE (two each for phi, lenses, and stimulus incongruity; three for reversible figures) were converted to standard scores. The total measure of TUE was the average of these nine scores. The average intercorrelation between the nine tasks that compromise the total measure of TUE is .153. Using this value, the reliability coefficient of the total measure of TUE, as computed by the Spearman-Brown formula, is .62.

Measurement of Amount and Integration of Unrealistic Thinking

Three tasks were used to measure unrealistic thinking.

Rorschach test

The administration and scoring of the Rorschach according to the Holt system has already been presented in Chapter III of this report.

Art Preference test

The second test that was used to assess ability to engage in integrated unrealistic experiences was a preference test for paintings with unrealistic content. Fifteen *abstract* (non-representational) paintings, selected to measure preference for forms which do not represent real objects, and fifteen *fantastic* paintings, selected to measure preference for views of the environment which could not really exist (e.g., Edgar Ende's "Midi," showing a man being paddled in a canoe through the air) were paired with works that contained neither abstract nor fantastic elements. All paintings were previously employed by Child (1962) in a study of artistic preferences. In that study it was found that abstract and fantastic paintings were generally preferred less than paintings in six other categories. In the present study, in order to get maximum range in the scales, five of the least preferred paintings in each of the six other categories used by Child were randomly paired with the abstract and fantastic paintings.

These 30 pairs were interspersed with 30 other pairs of paintings which were selected to measure preferences for drive-related paintings (to be described in the next section). In each pair, _S_ was to indicate which picture he liked better. It was assumed that preferences for abstract and for fantastic works indicated that _S_'s unrealistic experiences were well integrated, because he was able to enjoy such experiences. Scores were the number of abstract, and the number of fantastic paintings preferred. In order to get a total measure of preference for unrealistic paintings, these two scores were converted to standard scores and averaged. The theoretical expectation was that preference for forms which do not represent real objects (abstract paintings), and for views of the environment which could not really exist (fantastic paintings) would relate positively to TUE.

Word-Association test

Capacity to shift from unusual to common associations when instructed to do so was a third measure used to assess unusual modes of thinking (see Wild, 1964). Three lists of 30 words each were employed. Following Wild's procedure the test was first given with the usual Rapaport instructions ("spontaneous condition"). The test was then administered using instructions designed to elicit common associations ("conventional condition"). The instructions designed to elicit unusual or common associations consist of character sketches of an unconventional, original person on the one hand, and a highly conventional person on the other. The subject was asked to take the tests as the characters in the sketches would. Associations were scored common if they appeared in standard norms; all other associations were considered unusual. The shift score was the number of unusual associations given in the "unconventional condition" minus the number given in the "conventional condition." The shift score thus measured a capacity to engage in both unusual and in common modes of thought, depending on the demands of the situation. The theoretical expectation is that shift score would relate positively to TUE.

Measurement of Amount and Integration of Drive-Related Thinking

Two tasks (aspects of which have been discussed in the last section) were used to assess drive-related thinking.

Rorschach test

In addition to measuring unrealistic thinking, Holt's scoring system also allows measurement of drive-related responses where no unrealistic aspects are apparent. Included are responses containing oral, anal, sexual, exhibitionistic-voyeuristic, homosexual, and aggressive images. Exactly the same

Rorschach measures (amount, integration, and combined score) were used to assess drive-related responses as were discussed for unrealistic responses. The theoretical expectation was that scores on the combined measures would relate positively with TUE. As with the Rorschach scores for unrealistic thinking, no predictions were made for amount and integration scores taken alone.

Art-Preference test

Ten paintings with sexual themes (mostly nudes), ten with aggressive themes (mostly people fighting), and ten with oral themes (mostly people eating) were paired with thirty neutral paintings and were interspersed with the thirty other pairs selected to measure preference for unrealistic paintings. The aggressive, sexual, and oral paintings were selected from six categories of paintings used by Child (1962) -- the abstract and fantastic paintings were not used for this part. Each drive-related painting was paired with a painting in the same category that was judged about equally preferable in a previous sample of S̲s. For example, a nude (sexual content) ranked 15th out of 60 in the single women category would be paired with the painting of a woman ranked 14 in that category.

In each pair S̲ was to indicate which picture he liked better. It is assumed that preferences for works with sexual, aggressive, or oral themes indicate that S's drive-related experiences are well integrated because he can enjoy such experiences. Scores were the number of sexual, the number of aggressive, and the number of oral paintings preferred. In order to get a total measure of preference for drive-related paintings, these three scores were converted to standard scores and averaged. Theoretical expectations are that sexual, aggressive, and oral preferences should relate positively to TUE.

Results

The results will be reported in two sections. First the relationship between TUE and each of the three measures of unrealistic thinking will be reported (the three measures were derived from the Rorschach, Art-Preference, and Word-Association tests). Then the relationship of TUE and the two measures of drive-related thinking will be considered. All p values reported are for one-tail tests.

TUE and Unrealistic Thinking

Rorschach test

As indicated in Table 1, the theoretical expectation that

TABLE 1

Correlation Between Total TUE and Measures of Unrealistic Thinking

Test	Total TUE	P
Rorschach Test		
Amount	.08	N.S.
Integration	.46	<.025
Combined Score	.49	<.025
#Responses (R)	-.06	N.S.
#Unrealistic R	.14	N.S.
Art Preference Test		
Total	.22	N.S.
Abstract	-.11	N.S.
Fantastic	.49	<.025
Word-Association Test		
Spontaneous	.02	N.S.
Unconventional	.52	<.01
Conventional	-.26	N.S.
Shift	.62	<.01

scores on the combined measure (assessing amount of integrated unrealistic thinking) would relate to total TUE is confirmed. As can be seen in Table 1, for the combined score the correlation with Total TUE was .49 ($\underline{p} < .025$).

There was no theoretical expectation that amount, or integration taken alone would relate to TUE. Results in Table 1 indicate, however, that integration correlated significantly with TUE ($\underline{r} = .46$, $\underline{p} < .025$).

It should be noted that no significant correlations were found between TUE and total number of Rorschach responses (R) or number of responses with unrealistic material (R_u). The negligible correlations indicate that the findings described above were not a function of the use of R and R_u as denominators in computation of the Rorschach summary score ratios.

Art-Preference test for unrealistic paintings

As can be seen in Table 1, no confirmation was found for the expectation that preference for abstract art would relate to Total TUE ($\underline{r} = .11$). Confirmation was found for the expectation that preference for fantastic art would relate to Total TUE ($\underline{r} = .49$, $\underline{p} < .025$).

Word-Association test

As shown in Table 1, the expectation that the shift score would relate to Total TUE was confirmed ($\underline{r} = .62$, $\underline{p} < .01$).

A significant positive correlation ($\underline{r} = .52$, $\underline{p} < .01$) was found between the number of unusual associations given in the "unconventional condition" and Total TUE. As expected, correlation between the number of unusual associations given in the "conventional condition" and Total TUE was negative, but the relationship was not significant ($\underline{r} = -.26$). No appreciable correlation ($\underline{r} = .02$) was found between the number of unusual associations given in the "spontaneous condition" and TUE.

Total measure of amount of integrated unrealistic thinking

Total measure of amount of integrated unrealistic thinking was calculated by combining measures on the Rorschach, Art-Preference, and Word-Association tests. To this end, the combined score from the Rorschach, total score for preference for unrealistic paintings, and the shift score from the Word-Association test were converted to standard scores and the average of these three measures was used as the total measure of amount of integrated unrealistic thinking. The correlation of this total measure with Total TUE and with each of the nine individual TUE tasks is shown in Table 2.

TABLE 2

Correlations between Total Measure of Amount of Integrated Unrealistic Thinking and the TUE Measures

TUE Measure	Total Amount of Integrated Unrealistic Thinking	p
Total TUE	.66	$<.01$
Horse Movement	.41	$<.05$
Square Movement	.32	$<.10$
No. reversals, cross	.49	$<.025$
No. reversals, stairs	.07	N.S.
Unusual phase time, stairs	.05	N.S.
Lens speed	.40	$<.05$
Lens angle	.31	$<.10$
Incongruity, basketball	.47	$<.025$
Incongruity, girl	.35	$<.10$

The expectation that the total measure of amount of integrated unrealistic thinking would relate to Total TUE is confirmed ($r = .66$, $p < .01$). Significant correlations ($p < .05$) were found with horse movement, number of cross reversals, lens speed, and incongruity in the "basketball" picture. Correlations bordering on significance ($p < .10$) were found for square movement, lens angle, and incongruity in the "girl" picture. No significant correlations were found for number of reversals or unusual phase time for the staircase figure.

TUE AND DRIVE-RELATED THINKING

Rorschach test

Correlations of TUE with Rorschach measures are shown in Table 3.

TABLE 3

Correlations Between Total TUE and Measure of Drive-Related Thinking

Test	Total TUE	P
Rorschach Test		
Amount	.17	N.S.
Integration	.20	N.S.
Combined Score	.44	$<.05$
Rd	.13	N.S.
Art-Preference Test		
Total	.70	$<.01$
Aggressive	.48	$<.05$
Sexual	.34	$<.10$
Oral	.23	N.S.

As expected, the combined score on the Rorschach related significantly with Total TUE. There was no theoretical expectation that amount or integration, taken alone, would be related to TUE and no significant relationships were found for these two scores.

As previously reported, no significant correlation was found between TUE and total number of Rorschach responses ($\underline{r} = -.06$). Table 3 indicates that TUE also did not relate significantly with number of responses with drive-related material (R_d) either ($\underline{r} = .13$). These negligible correlations indicate that the findings described above were not a function of the use of R and R_d as denominators in computation of the Rorschach summary score ratios. Art-Preference test for drive-related paintings.

Table 3 indicates that total preference for drive-related paintings related significantly with Total TUE. Preference for aggressive paintings correlated significantly with Total TUE ($\underline{r} = .48$, $\underline{p} < .05$) and preference for sexual paintings tended to relate to TUE ($\underline{r} = .34$, $\underline{p} < .10$). Preference for oral paintings did not correlate significantly with Total TUE.

Total measure of amount of integrated drive-related thinking

Total measure of amount of integrated drive-related thinking was calculated by combining total score for preference for drive-related paintings with the combined score of the Rorschach test. Table 4 shows the correlation of this total measure with Total TUE and with the nine individual TUE scores.

TABLE 4

Correlations Between Total Measure of Amount of Integrated Drive-Related Thinking and TUE Measures

TUE Measure	Total Amount of Integrated Drive-Related Thinking	P
Total TUE	.71	$< .01$
Horse Movement	.43	$< .05$
Square Movement	.38	$< .05$
No. reversals, cross	.38	$< .05$
No. reversals, stairs	.32	$< .10$
Unusual Phase time, stairs	.27	N.S.
Lens Speed	.09	N.S.
Lens Angle	.24	N.S.
Incongruity, basketball	.46	$< .025$
Incongruity, girl	.55	$< .01$

The expectation that the total measure of amount of integrated drive-related thinking would relate to TUE was confirmed ($r = .71$, $p < .01$). Significant correlations ($p < .05$) were found with horse and square movement, number of cross reversal, and both incongruous pictures. Correlations bordering on significance ($p < .10$) were found for number of stair reversals. No significant correlations were found for unusual phase time for the stairs, or for lens speed or lens angle.

Discussion

In the present study the ability to perceive the contradictory and unusual experiences in a battery of perceptual tasks (TUE) was found to relate to: (a) amount of integrated unrealistic and integrated drive-related thinking on the Rorschach test, (b) ability to shift from unusual to common associations on the Word-Association test, and (c) preference for paintings containing fantastic and drive-related themes. The diversity of tasks which related to the perceptual measures of TUE supports the hypothesis suggested by Gardner, et al. (1959) that TUE represents a predictable style of behavior that determines a person's responses in a wide variety of situations. The Word-Association test is particularly relevant, for it adds further evidence to findings by Kaplan (1952) and Martin (1954) that tolerance for unrealistic experiences has relevance in tasks which do not involve visual perception.

Separate measures were obtained for amount of integrated unrealistic (that is, non-logical or contradictory) thinking and for the amount of integrated drive-related thinking, and both related in a similar way to TUE. High TUE was found in the individual who was generally able to integrate large amounts of both unrealistic and drive-related material with more logical and neutral thinking. The overall picture was of a person who could relax controls enough to enjoy unrealistic and drive-related experiences, but who maintained a degree of integration of such experiences by combining them with logical, orderly, and socially accepted thinking.

Lowest TUE scores were found in the individual whose thinking was often filled with unrealistic and drive-related thoughts and images but who was unable to integrate such material with more conventional or neutral thoughts. It would appear that low TUE represented an effort to maintain simple orderly experiences in a person who tended to become confused and disturbed by unrealistic and drive-related thoughts.

A number of other studies have investigated concepts similar to TUE. Frenkel-Brunswik's (1949) work with tolerance of ambiguity, Barron's (1952) work with preference for complexity, Berlyne's (1960) investigations of response to novelty, and Witkin's (1954) work on space orientation all seem to be tapping traits similar to TUE. One characteristic that these concepts have in common is that they all suggest that _Ss_' difficulties facing conflictful or complex perceptual situations is related to anxiety coming from sexual, aggressive, and other potentially antisocial impulses -- the person with more conflict about drives is assumed to have a greater tendency to avoid all conflictful experiences. Despite the importance of integration of drive-related material as a theoretical construct, little empirical work has been done to study the hypothesized link between control of drives and responses to perceptual conflicts.

The present study was designed explicitly to test the hypothesis relating integration of drive-related material with handling of the perceptual conflict involved in the TUE tasks. As described above, the findings indicated that a failure to achieve integration of drive-related thought with more neutral thought correlated with an avoidance of the conflictful situations involved in the TUE tasks. These results correspond to Witkin's (1954) finding that people who are more field-dependent have relatively poor control over aggressive and sexual impulses. Witkin's findings and those in the present study thus indicate that people who can integrate drive-related thought seem generally more open to internal sensations with less dependence on usual experiences with the external environment.

This capacity to resist overdependence on usual experiences seems to be related to concepts of creativity and rigidity, and the relationships between the present findings and these areas are worthy of discussion. Theoretical considerations suggest that TUE probably plays an important role in the creative process. The ability to make original contributions seems to require an openness to new relationships, and an ability to see beyond the constraints of conventional labels and anticipations. Schactel, (1959) for example, states that creativity requires the ability to see beyond the "performed cliches and angles as make up the world of 'reality' seen by society." Similarly Bellak (1958) comments that the creative process requires a weakening of the "sharply defined boundaries of figure and ground, of logical, temporal, spatial, and other relations."

The results of the present study indicate that the ability to engage in integrated unrealistic and in integrated drive-related thinking relate to TUE. Insofar as TUE seems to be a necessary aspect of the creative process, the results tentatively suggest that these same abilities (that is, to engage in integrated unrealistic and in integrated drive-related thinking) might also be involved in creativity. Such an interpretation is consistent with previous findings by Wild (1964), and by Pine and Holt (1959). These studies, taken together, lend support to the psychoanalytic concept of creativity (Kris, 1952) as involving the integration of primitive, drive-related, non-logical modes of thinking with more neutral, reality-oriented, logical thoughts.

It would be useful in future research to investigate whether people in fields assumed to require creative ability (e.g., art) show higher TUE than control groups selected from the general population. Similarly, will TUE distinguish "more creative" from "less creative" people within each field? The psychoanalytic theory of creativity (Kris, 1952) suggests that the capacity to perceive objects in unusual ways is important in almost all creative fields. A question of interest is whether TUE will relate differentially in fields which seem to require different degrees of dependence on visual perception. For example, will TUE differentiate more from less creative individuals in art but not in chemistry?

Low TUE also seems to be an aspect of rigidity when rigidity is defined, as in Cattell (1949), as the case with which old established habits may be changed in the presence of new demands. The aniseikonic lenses, for example, require relinquishing the habit of seeing rooms as rectangular, and floors and ceilings as level.

Although there is a great amount of work in the area of rigidity, few empirical studies have been done which shed much light on the nature of underlying personality factors which lead to rigid behavior. An exception is work done by researchers interested in "The Authoritarian Personality" (Adorno, Frenkel-Brunswik, Levinson, and Sanford, 1950). Workers in this area point out that a wide range of rigid behavior (e.g., as expressed in racial prejudice, rigidity in problem solving, intolerance of ambiguity, and so on) constitutes a "counterbalance to underlying conflicts often verging on chaos" (Frenkel-Brunswik, 1949).

The concept of "chaotic" underlying conflict was assessed in the present study by measures of amount of poorly integrated unrealistic and poorly integrated drive-related thinking. The low TUE subject was unable to organize fantasy and drive-related thoughts, and it appeared that in order to defend against these disorganized internal experiences the low TUE subject maintained a rigid, conventional, "safe" mode of responding in situations where socially acceptable, conventional responses were well delineated. This supports the concept that rigidity can represent defenses against disorganized internal experiences.

Before results from the present study could be applied to other types of rigidity it would be necessary to illustrate that the types of perceptual rigidity reflected in low TUE is related to rigidity in problem solving, in social values, and so on. An indication that there is some generality of TUE to other measures of rigidity is found in Hastorf's (1959) report of a significant positive correlation between time to recognize aniseikonic lens distortion and time to solve the extinction problem in Luchin's Einstellung test.

Finally it is worthwhile to return to a theoretical issue presented in the introduction. According to psychoanalytic theory one of the earliest and most important conflicts faced by the individual is that between the expression of drives and restrictions against such expression. A central concept in psychoanalysis is that modes of dealing with this early drive-conflict will determine the way the individual deals with later conflictful situations. The results of the present study indicated that a failure to achieve integration of drive-related thinking with more neutral thought was associated with an avoidance of the conflictful situations involved in the TUE tasks. These results are consistent with this general concept from psychoanalytic theory. The present study, of course, provides no evidence as to how the TUE mode of perceiving and the manner of dealing with drive conflicts are related to each other in the course of psychological development. Such information can only be obtained from future longitudinal studies which would relate impulse control and TUE at various developmental stages.

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CHAPTER V

SUMMARY

The results of the present series of studies in Part I indicate that the level of cognitive-perceptual efficiency can be related to important personality variables. Cognitive efficiency on a complex logical problem (PSI) and the capacity and willingness to experience accurately what seems to be an unrealistic perceptual phenomenon (TUE) both had highly significant positive relationships to a Rorschach measure of Adaptive Regression. This measure assesses the degree to which an individual expresses drive content and non-logical thinking (primary process) in an adaptive and appropriate form on the Rorschach. This measure of Adaptive Regression is based on two dimensions; the amount of drive content and illogical thought in the Rorschach responses (Defense Demand) and the level at which these primary process elements are integrated into realistic and understandable responses (Defense Effectiveness).

It is impressive that the measure of Adaptive Regression related significantly both to problem solving efficiency on the PSI and to TUE since these tasks seem to require somewhat different capacities and skills. The PSI is a highly complex and logical problem which requires systematic understanding of causal relationships and then the integration of these relationships into complex causal sequences. The task requires analytic and synthetic ability at a high level and seems to emphasize secondary process type of thought. Somewhat in contrast, TUE tasks require a capacity to experience seemingly unusual and unrealistic events in order to maintain accurate veridical perception. This seems to depend on a less logical and formal type of thought but not necessarily idiosyncratic, or drive-laden ideation. The TUE tasks measure a capacity to experience unusual perceptual events which have substantial reference in reality. Thus, TUE tasks seem to require a type of functioning which is somewhere near the midpoint on a continuum between highly logical thought and more archaic, internal, and idiosyncratic modes of thought which have relatively little relationship to external reality.

The relationships between Adaptive Regression and the two cognitive-perceptual tasks were explored further by examining the relationships between functioning on the two tasks (PSI and TUE) and the two components of Adaptive Regression (Defense Demand and Defense Effectiveness). Problem solving efficiency and the tolerance for unrealistic experiences did not relate significantly to Defense Demand (the amount of drive content and illogical elements) on the Rorschach. The relationships between this aspect of the Rorschach and functioning on both cognitive-perceptual tasks were negligible. But effective functioning on these tasks related more significantly with Defense Effectiveness (the degree to which the primary process elements were integrated into appropriate and acceptable responses). Problem solving efficiency correlated as well with Defense Effectiveness as it did with the more complex measure of Adaptive Regression. TUE correlated with Defense Effectiveness as well as it did with Adaptive Regression when Rorschach responses with illogical (Formal Primary Process) aspects were considered. In Rorschach responses which contained drive content (Content Primary Process), TUE did not correlate significantly with Defense Effectiveness, though the correlation with the more complex measure of Adaptive Regression was still significant. Thus, while problem solving efficiency correlated primarily with Defense Effectiveness, the less logical TUE tasks correlated significantly with Defense Effectiveness only in part. These findings, along with data from other studies, suggest that Defense Effectiveness may relate to the capacity to integrate successfully unusual experiences and ideas into meaningful, appropriate and creative responses. Defense Demand (the amount of Primary Process thinking) on the other hand, may relate to the capacity to have novel ideas and experiences and to think in unusual and idiosyncratic ways. Allison, for example, found that divinity students who reported that religious conversion experiences influenced their career decision differed from students without conversion experiences on Adaptive Regression. This difference in Adaptive Regression in the two groups of divinity students was primarily a function of differences in Defense Demand and not in Defense Effectiveness. As Holt suggests, Defense Demand on the Rorschach may be more related to the inspirational phase of the creative process, where unusual and novel ideas are created and generated. Defense Effectiveness may relate more to the elaborate and integrative phases of the creative process where unusual, unconventional, novel and illogical ideas are integrated into a meaningful, appropriate and realistic form.

Another important aspect of the present studies is the implication the results have for the Rorschach as an instrument in research. While only a few marginally significant relationships were found between conventional Rorschach scoring categories and the criterion measures of problem solving efficiency and TUE, the Holt Primary Process scoring of the Rorschach yielded highly significant and consistent findings. It seems that conventional Rorschach scores are only gross categories which must be more fully differentiated and articulated. The clinician ideally makes finer discriminations while working with a protocol and Holt seems to have developed a system which provides some quantification for important segments of the clinical inferential process. Holt's scoring system, based on extensive clinical experience with the Rorschach, provides sufficient range for subtle differentiations while at the same time providing quantification along dimensions which relate to the psychoanalytic theory of thought.

To illustrate further this point about the gross undifferentiated use of the Rorschach in research, two studies were conducted on the Whole (W) response to the Rorschach. The generally conflicting results, in studies that have attempted to test the assumption that Rorschach Whole (W) responses can represent "abstracting, surveying and integrating ability", can be viewed as a function of the tendency to replace thinking by test scores without adequate consideration of the theoretical rationale underlying the test scores. While it is fairly well agreed in the theoretical literature of the Rorschach that W responses must be differentiated in terms of their cognitive complexity and accuracy of reality articulation, research studies have followed the pattern of solely correlating simple number and/or percent of W responses with an IQ score. The contradictory findings in this research seem to stem from both the failure to discriminate the types and levels of W responses and from the inappropriate choice of the globally defined IQ score as the validating criterion with samples which have a restricted range of intelligence.

In an attempt to validate the Rorschach W response as an indicator of "abstracting, surveying and integrating ability," the quality of the W responses were scored according to the Friedman Developmental Scoring system and correlated with problem solving efficiency on the John-Rimoldi Problem Solving Apparatus and with scores on the Raven Advanced Progressive Matrices. In a sample of male graduate students no significant relationships were found between number or percent of Rorschach W responses and intelligence as measured on the Raven or with problem solving efficiency. Even when the levels of W responses were differentiated, intelligence and W responses were not significantly related. However, problem solving efficiency had a highly significant positive ($p < .01$) correlation with the number and percent of complex and well articulated W responses.

A second study investigated the relationship between Whole responses and intelligence by examining the qualitative features of Whole responses over a broad range of IQ. Five subjects were selected in each of eight ten-point WAIS IQ intervals ranging from 60-70 to 130-140. Using the Friedman scoring system it was found that only the cognitively complex and accurately perceived Whole responses had a positive significant relationship to IQ. These findings in both studies on the Whole responses as well as the results of the studies using the Holt Primary Process scoring system indicate the need in research for refining and revising conventional Rorschach scoring systems in research so that they more fully reflect the phenomena of interest and utilize the subtle and vital differentiations made by the clinician.

PART II

Studies of the relationship between personality variables and cognitive functions assessed on several subtests of the Wechsler Intelligence Test.

CHAPTER VI

INTRODUCTION[1]

The conceptualization and application of the intelligence test has gradually but persistently evolved and expanded in scope. This has been reflected in part in a shift away from a limited preoccupation with the global IQ score to a broader focus on the diverse tasks of an intelligence test as an assessment of ego functions. Increased interest has also been shown in the principles and patterns in which these various ego functions are organized and integrated into various types or modes of adaptation. Thus, while the purpose of early intelligence testing was to evaluate an individual's general intellectual capacity by comparing it to appropriate norms and standardization group, more recent conceptualization and utilization of intelligence tests have increasingly questioned the arbitrary separation between intelligence and personality. To some extent the inter-relationship of intelligence and personality was recognized at the outset, but in the somewhat static concept that personality factors could influence and interfere with test efficiency. For example, it was noted relatively early that many patients showed a decline or deterioration as well as marked variability in their intellectual functioning and interest was focused on the relationship between the range of the scores and various psychopathological conditions. This conceptualization of the relationship of psychopathology to gross scatter of test scores was then refined to include the hypothesis that the variability (or scatter) reflected selective impairments that were specific to various psychopathological states. The development of the Wechsler-Bellevue in the mid 1940's with its subtests, each of which was administered to all subjects, was an important stimulus to this revised, more refined concept of test scatter because the Wechsler scales permitted more specific and consistent comparisons to be made (Rabin, 1965). It was also with the development of the Wechsler scales that some of the guideposts were established for clarifying the inseparability of intelligence and total personality functioning. The addition of a theoretical analysis of the various psychological functions assessed by the different subtests (Rapaport, Gill and Schafer, 1945; Wechsler, 1944) supplied an interpretive rationale for viewing the inter-relationship of the various psychological functions reflected in subtest scores with personality organization. In large measure, this new approach reflected the systematic application to intelligence tests of the hypothesis that each act of the individual bears the imprint of his unique personality organization (the projective hypothesis). This more dynamic conception of intelligence as an integral aspect of personality organization has subsequently been re-emphasized, expanded and extended in more recent years (Fromm, Erika, 1954, 1955, 1957, 1960; Mayman, Schafer and Rapaport, 1951; Waite, 1961).

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[1] This chapter was prepared by Sidney J. Blatt and Joel Allison as part of a paper entitled "The Intelligence Test in Personality Assessment" which will appear as a chapter in *Projective Methods in Personality Assessment* (A. I. Rabin, Ed.).

This section of the report will examine the integral relatedness of cognitive processes and personality, primarily as it is observed on the Wechsler Intelligence scales. There are essentially three ways in which personality variables can influence and be expressed on the intelligence test:

A. The content of responses can contain personalized concerns and idiosyncratic preoccupations.

B. The style of responses, and the quality and nature of the clinical transaction represent aspects of personality organization.

C. The structure or organization of psychological functions as indicated in the patterning of diverse abilities, both between and within subtests, is an integral aspect of personality organization.

A. The content of specific test responses including asides and comments can reflect important areas of concern and preoccupation. Unlike the Rorschach and the TAT, the intelligence test assesses adaptive potential in situations that involve relatively habituated, routine functions and past achievements. A number of tasks are presented with the demand and expectation that responses be organized and realistic, and that they remain relatively free of personal issues and of primitive wishes and fantasies. In contrast to the Rorschach and TAT which permit less logical thought organization and encourage the embellishment and enrichment of responses by fantasies, the intelligence test requires functioning which is logical, organized and relatively attuned to reality.

In general, personalized concerns tend to interfere with efficient functioning on the intelligence test and their presence invariably serves as a harbinger of their increased prominence as situations become less restrictive and less structured and require the individual to organize his responses according to his inner world. Thus, minor content variations on the WAIS often appear in bold proportions on the TAT and Rorschach. The intelligence test, therefore, is not a test of central importance if one is primarily interested in learning about various content concerns of an individual. Content in the intelligence test is more relevant to assessing the degree to which such concerns enter into and interfere with cognitive efficiency in relatively routine, impersonal situations. Psychological functions such as perception, memory and visual-motor organization play important roles in adaptation (Hartmann, 1958) and for these processes to be effective they must remain relatively free and undisturbed by the various pressing concerns of the individual (Rapaport, 1958). When these cognitive functions are infused by drives and personalized preoccupations and organized by less logical principles (as in psychosis) efficiency is sharply curtailed. It is primarily in the severely neurotic and particularly in psychotic conditions that psychological functioning in the routine and relatively neutral situation of the intelligence test is undermined by personal preoccupations or autistic elaborations. For example, a girl with intense depressive concerns received only partial credit on the sixth Picture Arrangement of the WAIS (the flirt sequence) by arranging her cards in the order of JNAET. She explained her sequence by stating that the King has gotten out of his car because of his interest in the "hat" rather than in the girl, thereby suggesting her feelings that any interest on the part of men does not reflect recognition of her essential worth. This same patient in relating a fly and a tree on Similarities implied another aspect of her depression -- her oral neediness -- by seeing the similarity in the fact that "both require food to live." A more severe intrusion of a personal nature occurred in the WAIS of a chronic schizophrenic young man beset by feelings of unreality. When asked why we should keep away from bad company, he responded, "because from Confucius on down it is bad to associate with people more confused than yourself." Not only do the concerns expressed about confusion suggest the possibility of impaired reality testing, but the Clang association and the symbolic and non-relevant thinking in the blending of confusion and Confucius indicates that thinking can be alogical and governed by rather primitive principles.[2]

Though effective functioning on the WAIS generally requires a minimal intrusion of irrelevant material into responses, this does not mean that a well-intact WAIS protocol should contain only perfect "text-book" responses. Such records can be banal, trite and uninteresting, and reflect a highly conventional individual who may find difficulty in expressing personal feelings, interests, and needs. Highly organized skills and psychological functions should have a degree of autonomy from drives but it is equally important that a degree of autonomy be maintained from the environment as well (Rapaport, 1951, 1958). Though the degree of autonomy from the environment can be assessed most readily in an individual's capacity to give imaginative and creative responses to the Rorschach and TAT, the degree of autonomy from environmental demands can also be considered to some extent on the WAIS. The structure of the WAIS tends to limit the range of cognitive strategies that can be employed, but the subtests differ in the limitations and restrictions they place in defining an acceptable response. Subtests such as Information require circumscribed, precise responses while subtests like Comprehension and Vocabulary require more verbalization and have a wider latitude of acceptable responses. The content of responses on these subtests may reflect unique aspects of personality without necessarily indicating a disruption of functioning or pathology.[3] For example, in defining travesty, both "a mocking imitation" and "burlesque" receive full credit but it is of some interest when "burlesque" (a less usual response) is offered by a young man whose father is an accomplished actor whom he feels able to imitate only weakly but angrily in the caricatured style of an old, decrepit vaudevillian. Another example: in response to the question, "What is the Vatican?" subjects often allude only to its being the home of the Pope. It is less common to have included in the response -- still accurate however -- the fact that the Vatican is an enclosed city, as in the following response: "The Vatican is a city enclosed...which is within the confines of Rome and in which the Papacy of the Catholic Church has its seat." In this instance the reference to enclosure raises specific questions as to the relevance for this subject of issues of protection, and a felt need to maintain an internally imposed barrier against certain aspects of experience.

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[2] Although the relationship between Confucius and confusing might well appear in humor, this response was not presented as humor but rather as a serious attempt to cope with demands of the question. The attitude and mood tone which accompany a response are important aspects of the response process. A somewhat alogical answer could be offered as a humorous alternative or it can represent more pathological thinking when it has a forced quality or where the individual is unable to establish distance and juxtapose the humor with a more appropriate response.

Attitudes taken toward responses can aid in the differentiation of momentary playful and controlled regression from less voluntary and more persistant regressed modes of functioning (Kris, 1952; Holt & Havel, 1960; Schafer, 1958; Wild, 1966).

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[3] Assessing the individual's relative position in reference to conventional environmental demands is important in at least one other respect. The reality presented by the WAIS involves procedures and ways of perceiving and organizing experiences which are crucial for success in the "usual" tasks of our culture. Some members of our society live essentially in subcultures which are somewhat removed from the mainstream of middle class experience and from conventionally learned approaches to cognitive tasks. The WAIS (and most intelligence tests) presents a more novel situation to such people than they do to people schooled in the types of procedures and tasks presented by the tests. It is important to remember that though the WAIS is generally considered to be more structured than most other psychological procedures, it can also be experienced in very different ways depending upon earlier educational experiences.

Generally, however, the WAIS tells us more about autonomy from drives than from the environment since it places such a high premium on habituated, logical thinking. Successful, efficient WAIS functioning occurs within a structured and organized context and we must look to the results of a battery of tests which include a diversity of types of thinking, some of which permit relatively little variation in cognitive approach and discourage any embellishment of responses by drives and others which permit and even encourage more variation in style of approach and enrichment by drives. In this way we can observe a broader spectrum of a subject's adaptive efforts and note the degree to which he is equally at home with thinking which is based on more primitive principles of organization and contains drive content (primary process thinking) as he is with a more rigorous, logical, and drive-free approach (secondary process thought).

B. The subject's style of responding to the WAIS items is also relevant for personality assessment. Are the verbalizations, for example, pedantic, overdetailed, and marked by incessant qualification (obsessive style); or hesitant, blocked and interspersed with self-depreciatory remarks (depressive style); querulous, distrustful, legalistic and expansive (paranoid style); or euphoric, outpouring and excited (hypomanic style)? More subtle aspects of stylistic differences are also apparent in consistent approaches to the solution of a problem, e.g., when a subject routinely relies on trial and error behavior to solve certain Performance subtests, or shows a tendency to be inflexible in trying new alternatives when an initial effort at solution is found to be incorrect.

There is often no clear distinction between style of responding and the content of a subject's responses and comments.

Content features interact with functioning and often reflect not only the concerns of a subject but also the specific, and habitual modes or styles of response to internal and environmental stimulation. Relevant in this regard are statements to the tester which can reveal a variety of interpersonal styles. Schafer (1954) has discussed at length the varied styles of interpersonal relatedness which can occur in the Rorschach testing situation -- styles which he has classified as involving projection, isolation, intellectualization, compulsive perfectionism, repression, denial, reaction formation against hostility or dependent needs, passive demandingness, counterphobic defenses, or masochistic, ingratiating or rebellious attitudes.

It is revealing to assess such stylistic variations in the WAIS situation as well. A subject confronted with the Picture Completion item (a woman looking in a mirror) states, "the front leg on the left hand side is too short. Also, though the women is powdering her nose you can't see the reflection of her hand or the powder puff in the mirror. Nor can you see her right arm which should be visible in the perspective as it is." (What was intended to be missing?) "The reflection in the mirror. As I look at the leg now it's just a crude drawing." By shifting the locus of his difficulty from his own indecisiveness to the deficiency of the drawing this subject is, through his emphasis on orderliness, implicitly blaming the tester for confronting him with a crude, i.e., primitive, and possibly, messy stimulus. We can hypothesize further that it may be the "too short" leg and its suggestion of body deficit and castration which is disturbing to the subject. Instead of acknowledging to himself his upset in this regard or his indecisiveness when faced with this stimulus, he devalues the external stimulus and the tester. With this subject we would be alert to other indications of a similar style of response, namely becoming indecisive and meticulous and blaming others when faced with his own felt shortcomings or deficiencies.

C. The organization of specific cognitive functions, as measured by the subtests, is another source of data for understanding personality organization. The patterns of diverse abilities (intersubtest scatter) and the patterning of success and failure within a single subtest, reflect the organization of a number of ego functions which are important aspects of the capacity for adaptation. Recent research on cognitive styles and cognitive control principles has indicated that the organization of these ego functions reflects consistent modes of adaptation which includes general cognitive abilities as well as the styles of mediating, filtering and controlling drive and impulse expression in a wide variety of situations (Gardner, et al., 1959, 1960; Kroeber, 1964; Witkin, et al., 1962). Cognitive variables, like those involved in the WAIS (e.g., anticipation, planning, attention and concentration) are believed to represent the basic functions which are integrated into the broad principles of organization that appear early in development and are involved in psychological defenses as well as the processes which cope realistically with external reality.

It is important to stress that the various aspects of psychological functioning do not exist in isolation. Rather one is always observing and assessing the balance among affects, drives, defenses and cognitive controls.

If the pattern of scores on the WAIS subtests reflect general modes of adaptation, then there should be close concordance between the principles which account for the organization of these various psychological functions and other aspects of the WAIS protocol, such as the content of the responses and the style of the clinical transaction. Such consistency has been found between style of response, content of personal concerns and their psychosexual emphasis, symptom formation, psychological defenses, and cognitive abilities. These consistencies have been called character styles (e.g., Fenichel, 1945; Reich, 1949; Shapiro, 1965) and they are based in part on diagnostic concepts, but in an expanded sense. The concept of character is an attempt to differentiate general modes of adaptation on the basis of the styles of thinking, perceiving and experiencing rather than solely on the basis of manifest behavior, such as symptom formation. For example, a paranoid style will reflect a style of response that is cautious, rigid and legalistic; the content of concerns will tend to focus on insulation and protection and comments to the tester will often involve suspiciousness regarding the verbatim recording, feelings of being tricked and efforts to externalize and project blame for difficulty onto the tester and/or the test; the content of concerns moreover is likely to revolve around power (who is in control). As for the specific cognitive abilities, scores related to functions involving hyperalertness to details (Picture Completion and/or Picture Arrangement) and a heightened emphasis on bringing together and relating disparate things (Similarities) are usually intact and somewhat elevated compared to other functions in a paranoid character structure although not necessarily in a paranoid psychosis. The unique contribution of the

WAIS in this evaluation, however, is the understanding of the organization of the psychological functions assessed by the various subtests.

By using the WAIS to study organization of cognitive processes and the relative balance of primary and secondary process thinking, intellectual processes are considered as a more integral part of personality. A great deal of understanding about the organization of ego functions can be achieved through an analysis of the patterns of subtest scores.[4] Inasmuch as the scaled scores reflect an individual's standing on a number of specific abilities and psychological functions, variations between and within the different functions do occur as a result of the individual's uniqueness, whether the variations in adaptive capacity are because of strengths or because of weaknesses due to pathological impairment of certain processes. Each of these sources can contribute to variations in the subtest scatter and in each case they reflect the organization of psychological functions we call personality. The weighted subtest score, however, becomes meaningful only in the context of the total score pattern, for it is in the variation among scores that the particular organization of psychological processes is expressed and not in the absolute level of the scores. Thus, two people may have identical scores on a subtest, but for one it may be his highest subtest score, and for the other it may be his lowest subtest score. In interpreting a WAIS profile, then, a baseline must be established from which the variation in subtest scores can be viewed. This baseline assesses the general intellectual level of the individual and variations in subtest scores are considered in relation to it.

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[4] The following discussion of the Interpretative Rationale for WAIS subtests is from a forthcoming book The Interpretation of Psychological Tests, by Allison, Blatt and Zimet. We are indebted to Harper and Row for permission to present this material.

There are several baseline measures. The one most widely used is the Vocabulary subtest, since it is usually the single best estimate of intelligence and is relatively impervious to the effect of functional and organic conditions and to the overall decline in functioning which accompanies age. The subtests may be viewed as having positive or negative deviation from the Vocabulary score.

In order to fully utilize the concept of scatter, one must understand the particular psychological processes tapped by each of the subtests. In the section to follow, the psychological functions assessed by the subtests will be discussed. These interpretive rationales have been greatly influenced by the theoretical ego psychological formulations of David Rapaport and his colleagues (1945, 1951). It should be stressed that these interpretive rationales represent assumptions derived from extensive clinical experience and as yet, many of these assumptions have not been adequately evaluated in research.

Interpretative Rationale for WAIS Subtests

Verbal Subtests:

Vocabulary: As indicated previously, this scale correlates most highly with the Total IQ. This is so primarily because it represents the breadth of concepts, ideas and experience gained during one's lifetime. The acquisition of these concepts and their availability to memory is contingent both on innate ability and on an enriched early life experience. Although emotional conflicts as well as characterological features may affect the acquisition of an adequate vocabulary, it is in general, still the single best estimate of intellectual capacity, being stable over time and relatively resistent to neurological deficit and psychological disturbance. Because of its relative invulnerability, reliability and predictive capacity, the

Vocabulary subtest offers an excellent baseline to which other tests can be compared.[5] It is in relation to the Vocabulary score that one may consider positive or negative scatter, the elevation and heightened investment in certain ego functions, or the disruption of ego functions due either to temporary inefficiencies or to more marked and permanent organic or psychogenic problems.

Information: This subtest is seen as measuring the wealth of available information which, like Vocabulary, is acquired largely as a result of native ability and early cultural experiences, but which, unlike Vocabulary, is more alterable by defensive processes or by schooling or persistent efforts at academic achievement. Self-made men, for example, often show a level of Information that exceeds their Vocabulary scores. Rapaport, et al. (1945), indicated that the effort to acquire a general fund of information is frequently an indicator of "intellectual ambitiousness." Inasmuch as repression is geared toward blocking out memories from awareness, the acquisition of general knowledge is especially hindered by repression when it is a primary mode of defense (Rapaport, et al., 1945). Repression may interfere with the fund of information either in the initial learning process in which the material is acquired or in later attempts to recall the material. This concept of memory further implies that experiences are delivered into consciousness when a situation again appeals to the same needs, strivings, interests or affects with which the experience is linked in the subject's frame of reference. Repressive people, with their marked degree of memory blockage, therefore, are likely to show disruptions, inefficiency, and variability on a task like Information which concerns long range memory, relates to active intellectual strivings, and deals with piecemeal, sharply defined bits of experience. The obsessive-compulsive, on the other hand, with his characteristic pedantic emphasis on detail and his intellectual strivings, will tend to obtain a relatively high score.

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[5] An exception to this general rule occurs when early life experiences have been intellectually impoverished in some way, where intellectual stimulation has been minimal, as in many economically and socially deprived families, and where very early school experience has been irregular and disrupted. With such people one must look to scores other than Vocabulary such as the mean of all the subtests, to establish a baseline for comparison.

Comprehension: This subtest presents a subject with a series of more or less conventional social situations and asks about appropriate behavior and its rationale. Comprehension, therefore, measures a subject's grasp of social conventionality and social judgment (Rapaport, et al., 1945). This subtest is frequently a very sensitive indicator of maladaptation; low scores may represent a need to defy or ignore social conventionality, or they may indicate an impairment of judgment or a diminished interest in social interaction, as in schizophrenic conditions. Frequently the Comprehension subtest, because it deals with social situations and judgments appropriate to these situations, may yield material related to issues of morality and superego organization. Antisocial trends are frequently expressed in the content of the subtest via such comments as "check to see whether there's any money in it," in response to the envelope item. There are some psychopaths, however, who tend to score very high on this subtest; these are the more glib and socially facile individuals. However, high Comprehension may also represent a push toward hyperconventionality or conformity and reflect the naivete, conventional thinking and moral strivings of individuals with hysterical features. High Comprehension, especially coupled with lower Information, therefore, is characteristic for hysterics. The reverse pattern, high Information and lower Comprehension is generally seen in the obsessive-compulsive, largely because of the obsessive's uncertainty and excessive qualification but excellent fund of information.

Similarities: This subtest is essentially a measure of verbal concept formation (Rapaport, et al., 1945; Wechsler, 1958). Conceptual abstraction can be carried out on one of three general levels of cognitive development (Rapaport, et al., 1945). The concrete similarity between two objects, a specific common feature of the objects (e.g., a table and a chair both have legs or a dog and a lion both have fur) represents the lowest level of cognitive development. This type of concept formation, which is correct in a limited sense, acknowledges a most direct and obvious feature of the objects without attempting to reach for broader and more abstract generalizations. The thinking is unusually specific, direct, limited in focus, and generally constitutes a rather poorly articulated concept which at best receives only a partial score. A second type of concept formation is the functional definition which defines a utilitarian purpose as the basis for the conceptual category (e.g., piano and violin, play them both). Though this type of abstraction of concept formation is more sophisticated than a concrete conceptualization, it still falls short of a high level abstraction. In terms of personality functioning, the extensive use of functional categories may indicate an inability on the part of the ideational processes to serve as a buffer against impulsive action. Rather than ideation serving as a form of delay and planning, a general move toward activity and acting out may be indicated. The third type of concept formation is the abstract level, which captures the essential common characteristic of the objects. This is the highest level of thought and stands in marked contrast to the prior two forms of more concrete thought processes (Rapaport, et al., 1945). From the general level of abstraction on the Similarities subtest, and also from its relationship to the Vocabulary baseline, and the qualitative features of the derived concepts, valuable clues can be derived concerning the level, flexibility, and appropriateness of conceptual thinking and the role of abstract ideational processes in the subject's total psychological organization.[6] When

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[6] Concrete and functional responses may also be a function of impoverished educational experiences rather than reflecting psychopathology or intellectual limitations.

Similarities fall exceptionally low within the scatter, one may suspect central nervous system impairment. In acute schizophrenic states, impaired thought processes would not be limited to Similarities, but, as will be discussed shortly, would also affect such other scales as Comprehension (judgment) and possibly Arithmetic (concentration). Similarities because of its demand for abstraction tends to be elevated in character styles such as the obsessive and the paranoid where there is an emphasis on abstract and symbolic modes of thought.

Digit Span: In presenting a subject with increasing lengths of rote material for immediate memory and recall, this subtest generally taps passive reception of stimuli and the automatic effortless process called attention (Rapaport, et al., 1945). Attention functions best when it is not disrupted by preoccupations, anxiety, or the intrusion of drive derivatives. A Digit Span score which is markedly below the Vocabulary level tends to indicate the presence of anxiety whereas a Digit Span score which is high in relation to Vocabulary indicates blandness of affect and is frequently found in detached, schizoid people. In schizoid records the blandness usually represents a lack of conscious anxiety, chronicity and an acceptance of pathology. High Digit Span, which indicates a lack of anxiety, may also be seen in psychopathic protocols and in hysterics characterized by "belle indifference." Conversely, a low Digit Span may suggest a more positive prognosis, since it reflects an acute state of subjective distress in which the disorder has not become egosyntonic or the person comfortable with it and unmotivated to change. A one to three point difference may be expected in favor of digits forward over digits backward. If this pattern is reversed, one should also be alerted to blandness or negativism.

In other contexts, low Digit Span may have yet another meaning. One of the primary features of central nervous system damage is a severe distractability which accompanies diminished cortical control. The capacity to attend is adversely affected by distractability, and, therefore, an impoverished Digit Span with added indications of concrete concept formation and unusual motor impairments frequently is seen in brain damaged patients.

Arithmetic: Complex arithmetical reasoning requires extensive concentration and attention (Rapaport, et al., 1945). Concentration is foremost in this task, since the subject has to focus actively his attention in order to acquire the information within the problem and to manipulate meaningfully its complex dimensions. The subject must attend to the specific numbers of the problem, maintain an overview so that various elements are seen in their relative position in the problem matrix and the inter-relationship between the various elements must be manipulated in order to arrive at a solution. The tasks on the Arithmetic subtest require the subject to utilize skills that have been attained comparatively early in development and during the educational process. In this sense the subject has to turn back to prior skills and apply them to a particular task. The test also introduces time pressures for the first time, and the subject is forced to apply himself actively to the problem while reducing distracting elements from within the problem or from the total environment. Arithmetic is like Vocabulary and Information in that it depends upon memory and prior learning, but it differs markedly in the fact that it requires concentration and active application of select skills to cope with a new and unique situation.

By comparing functioning on the Digit Span and Arithmetic subtest, the relative balance between attention and concentration can be ascertained. Attention is the relatively passive and automatic reception of stimuli without effortful attempts to organize the material or to establish mnemonic devices. It is usually a one step assimilation of a stimulus field which can be disrupted by internal preoccupations. Concentration is a more active, effortful process, and, though it depends on attention to some degree, it goes beyond it in organizing and manipulating a complex series of events. The relative balance and interweaving of these two psychological functions have important implications for understanding psychological organization (Rapaport, et al., 1945). Efforts to compensate for disruptions in attention, for example, often involve extensive efforts at concentration to bolster processes which should occur in a relatively automatic way. Lapses in attention usually occur as a function of anxiety, whereas difficulties in concentration indicate more serious thought disorder. This interpretation of possible thought disorder, however, may be made only when Arithmetic and Digit Span are widely disparate. A low score solely on Arithmetic relative to Vocabulary, for example, is typically found in hysterical and narcissistic individuals who avoid active, effortful ideation and the elaboration of internal experience. The diagnostic implication of an Arithmetic score lower than Digit Span becomes all the more critical when Digit Span is higher than Vocabulary, for then it indicates a lack of anxiety and a blandness when there are difficulties in concentration (Rapaport, et al., 1945). Should both Arithmetic and Digit Span be low, as frequently occurs in anxious, unreflective hysterics (or in brain damage), impairments both in active concentration and attention are present. The differential relationship between Arithmetic and Digit Span and their relationship to the Vocabulary baseline, therefore, are most important diagnostic considerations.

Performance Subtests

Picture Arrangement: In arranging a series of sketches into a sequence which creates a meaningful story, the subject is required to understand the inner relationships of a series of events and to grasp the essential message of a social interaction. The skill necessary for seeing the inner connections between sequences of enduring, continuing, and causally related events, is really a capacity to recognize what effects one event has on the next. Meaningful continuity in everyday experiences is largely dependent on the capacity to anticipate, to judge and understand the possible antecedents and consequences of any event. Poor performance on this subtest frequently reflects an impaired capacity to anticipate events and their consequences and to plan effective courses of action (Rapaport, et al., 1945). On the other hand, subjects with cautious, guarded, hyperalert paranoid features are frequently extremely sensitive to social events and consequent behavior and are highly involved in an attempt to anticipate the future. Their psychological orientation may be reflected in an elevation of the Picture Arrangement subtest score.

The Picture Arrangement subtest also reflects, as does the Comprehension subtest, the response to stimuli that are concerned with social interactions. These two subtests allow comparison of well learned social conventionalities (Comprehension) with the capactiy to anticipate and plan in a social context (Picture Arrangement). A profile containing high Picture Arrangement but low Comprehension scores may be seen in a character disorder where there is sensitivity to interpersonal nuances, but a disregard for social conventionality. The glib psychopath with a social facade may receive high scores on both the Comprehension and Picture Arrangment subtests. It should also be noted that Picture Arrangement is the only subtest that contains an element of humor. Frequently the inability to see the humorous aspects of life interferes with an optimum capacity to function on this subtest.

Picture Completion: This subtest requires visual organization and the capacity to attend to and observe the inconsistencies and incongruities within a picture. One must focus attention on the details of the picture and actively examine and check the drawing, either in terms of its symmetry or in terms of an internalized image of the object. In this sense the major function seems to be, again, concentration, but the contradistinction to Arithmetic, the concentration is directed towards an externalized form and there is only minimal demand for the more internalized processes required in the Arithmetic subtest (Rapaport, et al., 1945). As in Arithmetic, the time limit is of considerable importance in placing additional demands upon the subject. The instructions of this subtest ask the subject to appraise critically and look for defects within the stimuli. Occasionally this subtest may be affected by a subject's reluctance to criticize, to assert himself, to attack actively or find fault with an aspect of his environment. The Picture Completion score will be high and frequently have positive Vocabulary scatter in paranoid subjects for whom hyper-alertness and hyper-vigilance is a prime mode of functioning. Obsessive-compulsives may also have inflated scores because of their pedantic, meticulous examination of every aspect of the picture. Since the objects or people are shown in an incomplete state, a low score may reflect concerns over bodily intactness with a possible emphasis on castration concerns; a low score may also be seen as a function of passivity. Specific conflictual issues may be reflected in long delays, failures on relatively easy items, or failures involving particular content. This latter type of failure often takes the form of an emphasis on "supports" missing, e.g., someone holding a pitcher, or the flag, or else in an emphasis on people missing, e.g., no one in the rowboat. Depending on the context, missing supports may reflect feelings of helplessness and passivity and missing people may reflect feelings of estrangement from people and a need for contact.

Object Assembly: In dealing with jigsaw puzzles, subjects are required to grasp a whole pattern by anticipating the inner relationship of the individual sections. On some items and for some subjects, anticipation of the final pattern is immediate and the task is one of simple visual-motor coordination (Wechsler, 1958). On more difficult items within the subtest, some subjects may not have immediate insight into the final pattern, in which case the subject frequently resorts to trial and error behavior. Bringing subparts together often furthers the progressive emergence of the total pattern, and in this press toward solution one can observe the subject's capacities for trying new leads, for shifting set, and for functioning on minimal cues.

Equally important is observing the smoothness, accuracy and rapidity of a subject's visual-motor coordination which may express habituated and stereotyped motor actions. Also, in presenting an object which has been broken apart, we implicitly confront the subject with something dismembered. Performance on this test, therefore, is adversely and particulary affected by intense concerns over bodily integration and intactness and/or inadequate defenses against these concerns. It should be noted that on occasion blocking occurs on specific items which may also be related on conflictual issues (e.g., on the hand in subjects with concerns over aggression or masturbation).

Block Design: In this test of visual-motor organization (Wechsler, 1958), the subject is presented with a pattern which he is asked to reconstruct out of blocks that are identical to each other in size and design. Block Design differs markedly from Object Assembly: in Object Assembly the end product must be anticipated from the part objects; in Block Design the final pattern is presented and must be broken down and then reconstructed in block size units (Rapaport, et al., 1945; Wechsler, 1958). The differentiation of a part of a design and the specification of its inter-relationships with other parts is essentially a concept formation task involving both analysis and synthesis. The visual organization demanded to differentiate partially a total design and the motor action needed to integrate the blocks is frequently interfered with by central nervous system damage. Since anxiety interferes with attention to small details, performance is facilitated by the blandness and lack of anxiety frequently seen in schizoid personalities. It is important to note the procedure which the subject uses to duplicate the pattern, i.e., whether it is orderly and follows along the outline of the blocks or is haphazard and goes from one section of the design to the other in a random pursuit to find the "magical" clue.

Digit Symbol: In comparison to the other performance tests, Digit Symbol is generally a measure of the capacity for imitative behavior (Rapaport, et al., 1945). It requires relatively little learning, concept formation, anticipation planning or analytic-synthetic functioning. Rather, it involves the simple utilization of energy for a smooth and unhesitating duplication of simple patterns (Wechsler, 1958). In the past the Digit Symbol subtest was thought to be a measure of learning ability. Recent research, however, has indicated that a minimal degree of learning takes place during this task and also that few subjects rely heavily on memory; therefore, we see the test primarily as a measure of the capacity to utilize energy in a simple task. Inasmuch as the subject is required to muster up energy and to apply it, this task reflects the amount of energy output a subject can generally bring to his work and his activities. Thus, a low Digit Symbol, markedly below Vocabulary, is frequently a sign of a depressive lack of energy output, whereas Digit Symbol above Vocabulary may be evidence of an overcompliant striving and a desire for achievement going beyond one's intellectual capacities. It is also noteworthy that this is the first subtest in which subjects are asked to write, to use a pencil. Particularly for school-age subjects this test may arouse feelings about classroom demands. Digit Symbol, when it is elevated above other Performance tests, indicates that reduced functioning in the other Performance tests may not be due to a lack of speed and low energy output, but rather to specific problems related to the unique functions tapped by these other subtests.

The relationship of Digit Symbol to Digit Span is often of particular diagnostic import. We have observed a frequent pattern in which Digit Span is relatively low and suggests considerable anxiety and Digit Symbol is relatively high and reflects a marked energy output. In these cases, the individual seems to be controlling strong and pressing anxiety by excessive activity. This activity may represent an attempt to conform and win approval and acceptance. Such passivity, conformity and even ingratiation could be in the service of reducing the level of anxiety by minimizing the possibility of attack and criticism.

When we find the reverse pattern, a high Digit Span and a low Digit Symbol, we are usually confronted with an essentially depressed person who is attempting to ward off recognition of depressive affect perhaps in a hypomanic way, usually via denial, but not necessarily through activity and acting out behavior.

Digit Symbol, also, like Digit Span and Block Design, deals with essentially neutral, content-less material and it may be for this reason that some people, e.g., schizophrenics, at times do especially well on these subtests despite the fact that these patients clinically may show highly anxious behavior and despite the finding that performance on these subtests is particularly vulnerable to the effects of anxiety. With such schizophrenics it is their basic blandness, their isolation from, and lack of relatedness to, their seemingly intense affects and also their heightened powers of attention and passive receptivity in contrast to their impaired concentration, that is revealed through their high scores on these subtests.

Differences in Verbal and Performance IQ:

In addition to evaluating the specific subtests, inferences can be obtained from the comparison of the Verbal and Performance IQ's. In the Bright Normal and Superior ranges, the Verbal IQ usually tends to be a little higher than the Performance IQ, and the difference increases as the Full Scale IQ rises because marked abilities and accomplishments in one area lead to a relative de-emphasis on the development of other functions. Thus, for the highly ideational person, efficiency in motor activities will often lag behind verbal efficiency. An eight to ten point difference between Verbal and Performance IQ's where there is, for instance, a Total IQ of 135 (e.g., Verbal IQ, 138, Performance IQ, 127, Full Scale IQ, 135) is of limited diagnostic significance and indicates only a highly verbal subject with possible obsessive-compulsive tendencies. When the Verbal IQ begins to have a marked imbalance over the Performance IQ (by greater than 15 points), more serious pathological trends may be considered.

A markedly obsessive concentration on words and thoughts or an extreme variability in functioning such as might result from a psychotic condition may be apparent. Usually, however, and depending on the subtest scores, two additional possible inferences are suggested by a marked elevation of the Verbal over the Performance IQ: depression and/or central nervous system pathology. Depression often involves psychomotor retardation and tasks with time limits and those subtests which require active manipulation tend to reflect this retardation. On the Performance scale, Digit Symbol in particular but also Object Assembly and Block Design, are generally lowered. The Performance IQ is also lowered in brain damaged patients, but rather than solely affecting subtests on which speed is an issue, brain damage involving visual-motor deficits is reflected on those Performance subtests which require planning, organization, concept formation, concentration and attention. Block Design in particular is a difficult task for these patients, and the score on this test is usually lower than any of the other Performance subtests. Several Verbal subtests, Vocabulary and Information, are often unaffected in brain damaged patients, since much of the material is explicitly contingent upon prior experience and has been overlearned. Thus, while there may be some decrements in the Verbal IQ of organic patients because of low scores on Digit Span, Arithmetic and Similarities, the Verbal IQ is maintained at a level closer to the premorbid intellectual level than is the Performance IQ.

In the lower intelligence ranges, the Performance IQ tends to be a little higher than its Verbal counterpart, largely because the emphasis on motor functioning tends to be associated with a reduced investment in ideational modes. But a Performance IQ greater than a Verbal IQ in patients of at least average intelligence is atypical. Three major diagnostic trends, all of which have acting out as a primary feature, are suggested by such a pattern: hysteric, narcissistic and psychopathic character disorders. In the hysteric, the repression of impulses and impulse derivatives usually results in restriction of intellectual and cultural interests and pursuits. Functioning on the Verbal scales of the WAIS is often strikingly influenced by repression, naivete, and inability to remember, and although hysterical women from rich cultural backgrounds may acquire a superficial cultural and intellectual veneer that can lead to an elevated Verbal IQ, this "modern" hysterical pattern still maintains much of the subtest scatter seen in the more classical hysterical states (especially the Comprehension above Information). Performance IQ is also often higher in narcissistic character disorders and in individuals with psychopathic trends (Wechsler, 1958), since these are generally "action oriented" people who are unable to establish the delay necessary for dealing with questions requiring thought and concentration and internal elaboration. They are much more comfortable with tasks which require external manipulation and action, and thus function better on the Performance subtests. The comparison of the Verbal IQ and Performance IQ and the examination of the pattern of the subtests of the WAIS is an important step in the diagnostic process. It allows the clinician to describe the individual's unique organization of psychological functions and from this to infer the defenses, the nature and quality of the drives and impulses, the degree and type of pathology, as well as his assets and capacities for adaptation and coping.

Though there has been extensive clinical application of these psychoanalytic ego psychological formulations (Rapaport, Gill & Schafer, 1945), there has been relatively little systematic investigation of the assumptions about the particular functions assessed by the Wechsler scales and how these functions differentially relate to personality organization. The second part of this report presents a series of studies which have attempted to examine, test and extend some of the hypotheses derived from this ego psychological conceptualization about the relationship between cognitive processes as assessed on the WAIS and dimensions of personality organization.

As pointed out by Rabin (1965) one of the major difficulties in attempting to evaluate hypotheses about selective impairment and the patterns of organization of cognitive functions may be the persistent use of nosological or diagnostic categories as validating criteria. Many problems exist in the use of nosological concepts in clinical research. Studies often use these classifications as if there is a universal agreement about the conceptual definition of the categories. Rarely do investigators indicate their criteria; schizophrenia, for example, is rarely defined or differentiated from other psychotic states. Not only is there frequently wide variation about the definition of diagnostic categories, there can also be sharp disagreement within a single clinical facility. Even if there were essential agreement about the conceptual basis, these criteria are frequently applied with varying degrees of precision. It is unusual for a research paper to specify the degree of reliability between judges or even to simply indicate how the diagnostic classifications were established. One rarely has a basis for knowing whether a diagnostic classification was established as an admitting diagnosis by a first year trainee or resident after a brief twenty minute interview or whether it was the considered and joint opinion of a diagnostic council after weeks of intensive study of the patient. With such poorly defined criteria, frequently applied in imprecise ways, there is little surprise that the research with diagnostic categories has led to ambiguous findings. The number of studies attempting to compare organics, schizophrenics, character disorders, neurotics, hospital attendants or nurses and college students are by now legion. These studies continue despite the fact that there is increasing disillusionment with current diagnostic categories which are at best, a gross classification system. Usually in clinical work, diagnostic assessment involves a dynamic formulation which includes several levels of psychological organization which transcend any single category. Rather than searching for specific patterns for particular diagnostic categories, a more productive line of research may be to test systematically the assumptions about the processes assessed by individual subtests and how they are organized into consistent modes of functioning. Specification of the individual processes assessed by the subtests and their inter-relationship and organization may in turn lead to more meaningful and precise conceptualizations of psychopathology. This approach does not have to be limited to test scores, it can also include qualitative aspects such as the style of verbalization, content of responses, the tone of the clinical transaction and the individual's attitudes towards his performance.

In the following chapters a number of studies will be presented which attempt to investigate assumptions about some of the relationships between particular Wechsler subtests and personality variables. Chapter VII, will present several studies on the Picture Arrangement subtest which were conducted with the collaboration of Louis S. Dickstein and Paul Quinlan. Chapter VIII presents a study of the Object Assembly subtests conducted with the collaboration of Joel Allison and Bruce L. Baker. Chapter IX examines a hypothesis about the relative balance between the Information and Comprehension subtests. This research was conducted in collaboration with Joseph LoPiccalo. Chapter X presents three studies on the Digit Span and Digit Symbol subtests. Elizabeth Fox, A. Robert Sherman and Paul Wachtel participated in these studies. Chapter XI presents a study conducted by Paul Wachtel which attempted to examine, in a broader context, an issue raised in the prior chapter about the relationship between anxiety and attention.

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CHAPTER VII

The Wechsler Picture Arrangement Subtest

Study A:

Death Concern, Futurity, and Anticipation[1]

Despite the fact that death has been a prominent concern in philosophy, literature, and religious thought throughout the ages, only in the last decade has there been a systematic examination of the relevance of death concern as a psychological variable. Wahl's (1959) observation that death is as much a taboo topic in American society today as sex was in Vienna in the time of Freud has been supported by Feifel's (1963) report of the resistance he encountered in attempting to conduct research in this area. In contradistinction to American psychology, death concern has emerged as an area of great interest and importance in European existential thought. This work is a rich source of hypotheses for further research.

Research on attitudes toward death may be subdivided into two areas: the meaning of death to man and the relationship between attitudes toward death and personality organization. Studies in each of these areas have resulted in contradictory hypotheses and inconclusive findings. In discussing the meaning of death, Freud (1925 [1915]) maintained that man in his unconscious feels himself to be immortal. Death has no personal meaning, and man's fear of death derives from his unconscious wish for the death of loved ones. Dread of death, therefore, is a secondary phenomenon. Jung (1959) argued that death contributes meaning to life and that the collective unconscious seeks to prepare man for death. Chadwick (1929) concluded that death is feared as an equivalent of the helplessness of childhood. Bromberg and Schilder (1933, 1936) found that the meaning of death differs among individuals as a function of early childhood experiences. Among the more prominent meanings were escape from an unbearable situation, the forcing of affection from significant love objects, an equivalent of sexual intercourse, the attainment of narcissistic perfection, and the gratification of masochistic tendencies. Wahl (1959) linked death fear to the child's hostile death wishes, his belief in his omnipotence, and his belief in the Law of Talion. Kaufmann (1959) and Feifel (1963) saw death as challenging man to accomplish something in a limited span of time. Murphy (1959) proposed that fear of death may mean fear of losing consciousness, fear of loneliness and separation, fear of the unknown, or fear of punishment. Finally, McClelland (1963) reported that in the fantasies of dying women death represents illicit sexual seduction, guilt, and punishment.

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[1] This study was conducted by Louis S. Dickstein and Sidney J. Blatt and published in the Journal of Consulting Psychology, 1966, 30, 11-17.

These statements about the meaning of death seem to be contradictory. Death, however, must have a multitude of meanings depending upon such factors as age, sex, and the imminence of death. An individual at any given time can consider death from many vantage points such as its impact on his family and friends, on his work, or upon himself as a physical entity and as an experiencing being. Even within each of these areas, the prospect of death can be experienced at a number of levels ranging from primitive fantasy representations with drive-laden content to more realistic and logical awareness of its implications. Thus, there seems to be no unitary meaning of death, but rather many implications and meanings which vary as a function of age, sex, health, intellectual ability, socioeconomic level, and the psychological level of discourse.

The empirical studies relating attitudes toward death to other variables also seem to be contradictory. Middleton (1936) found college students to be unconcerned about death, to have a strong desire for immortality, and to prefer not to know whether or not the future life exists. He found no sex differences in these attitudes. In contrast, Alexander, Colley, and Adlerstein (1957) found that death is an affect-laden concept for college students equal to concerns about school and sex. Another study (Alexander & Adlerstein, 1959) showed that anxiety about death is most rapidly stimulated among people who have taken no position on immortality. This study also found religious students reflect more about death than do nonreligious students, who are seen as relying more heavily on denial. Feifel (1959) found that women are more concerned about death than men and that religious people are more afraid of death than are nonreligious people. He suggested that religious groups use religion defensively in an attempt to reduce their fear of death. In a later study (Feifel & Heller, 1962), this finding is qualified as referring to people with extrinsic religious beliefs. Kastenbaum (1959) found that most adolescents live in the present, reject death, and disconnect it from the rest of their lives. Fifteen percent of the subjects did express concern about death, and these adolescents were seen as resisting cultural influences and attempting to structure their lives in terms of goals far removed in time. Scott (1896) reported that the peak of concern about death comes in adolescents. In a recent symposium on the attitudes of the aged toward death, there was relatively little agreement. Rhudick and Dibner (1961) found negative attitudes toward death related to neuroticism and depression. In contrast, Swenson (1961) found that those who were healthy and had many interests were the ones with the least positive attitude toward death.

A third report in this symposium (Jeffers, Nichols & Eisdorfer, 1961) found that people with few interests were more afraid of death.

It is difficult to relate these inconclusive and often contradictory findings to each other because the studies utilize diverse methods of measurement such as interviews, questionnaires, Thematic Apperception Test (TAT) administrations, polygraph recordings, word associations, observer ratings, and the semantic differential. These various methods assess different components of attitudes toward death as well as different levels of awareness. For the most part all the studies cited explored the relationship between death concern and global demographic variables such as age, sex, and religious belief. The present study was designed to investigate the relationships between degrees of conscious preoccupation or concern about death and some more general psychological processes. Information about these relationships should yield greater understanding of the psychological significance of death concern.

One of the primary ego functions which seems to be related to death concern is temporal experience and, more specifically, furture time perspective (FTP). Arieti (1947) discussed FTP in terms of a capacity to anticipate, that is, "the capacity to foresee or predict future events even when there are no external stimuli which are directly or indirectly related to those events [p. 471]." Arieti (1947) believes that anticipation "occupies the greatest part of man's thoughts and consequently determines the greatest number of man's actions [pp. 473-474]." It is anticipation that Arieti sees as responsible for planning, for anxiety, and for the knowledge of one's inevitable death. Bonaparte (1940) also discussed the relationship between death concern and temporal experience. She pointed out that the universally familiar figure of Time with his long white beard and scythe is much like another figure who also wields a scythe, the grinning skeleton representing Death. Bonaparte (1940) stated that most systems of philosophy "have to a greater or less extent tried to banish the presence of time which seems to bring us into this world only to destroy us as quickly as possible [p. 463]." It is only when we become aware of the passage of time that we appreciate the temporal limits of our lives. In childhood and senescence, life exists only in the present and therefore there is no concern about death. Even in adolescence, Bonaparte feels that life seems to spread out in a limitless expanse and that if there are any concerns about death at this time they are not experienced as serious or real.. Similarly, the Hindu living in a relatively timeless world is unconcerned about death. One of the few exceptions to the philosophical attempt to eliminate time cited by Bonaparte is Bergson. He saw man as existing in time and as part and parcel of it. "A splendid 'elan vital' sustains us, we are free, we progress with each succeeding generation [Bonaparte, 1940, p. 460]." Awareness of the passage of time, rather than eliciting concerns about death, leads to a more intense identification with the onward flow of life.

The measurement of FTP is a recent development, and one of the early empirical studies in this area was that of LeShan (1952) who related it to social class. He first developed a technique to measure FTP in spontaneously told stories. This technique was modified by Barndt and Johnson (1955) and Wallace (1956) into a story-completion method. This procedure measures future extension which is defined as the degree to which the individual projects himself into the future. Studies utilizing this procedure have related FTP to delinquency (Barndt & Johnson, 1955), optimism (Teahan, 1958), and interpersonal relations (Davids & Parenti, 1958). The research literature indicates that this measure of extension is a meaningful measure of FTP. A second measure of FTP is the Picture Arrangement subtest of the Wechsler Adult Intelligence Scale (WAIS). This subtest has been conceptualized by Rapaport, Gill, and Schafer (1945) as a measure of the capacity for anticipation, and this hypothesis has received empirical support in a recent investigation by the authors of the present study.[2]

The purpose of the present study was to investigate the relationship between degree of conscious death concern or preoccupation and temporal experience. Though both Arieti and Bonaparte suggested that death concern emerges from temporal awareness and anticipation, Bergson and personal experience suggest that the opposite may actually be the case. An individual whose temporal awareness extends into the future may perceive himself as a participant in the stream of life with death a remote concern.

PROCEDURE

The subjects of this study were undergraduate students at Yale University in an introductory psychology course. Seventy-six students were given a questionnaire designed to measure preoccupation with death as part of a classroom procedure. The questionnaire consisted of eight items, and the student was asked to encircle the most adequate answer for each item even if it were not completely adequate in describing his position. The eight items read as follows:

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[2] Picture Arrangement scores related significantly to FTP in story-completion stems and in TAT protocols. This research is currently being prepared for publication.

1. a. I think about my own death more than once a week.
   b. I think about my own death once a week.
   c. I think about my own death once a month.
   d. I think about my own death once every few months.
2. a. I think people should first become concerned about death when they are old.
   b. I think people should first become concerned about death when they have children.
   c. I think people should first become concerned about death when they get married.
   d. I think people should first become concerned about death when they are in college.
3. a. Death must be a major concern in evolving a philosophy of life.
   b. Death is of some concern in evolving a philosophy of life.
   c. Death is of little concern in evolving a philosophy of life.
   d. Death is of no concern in evolving a philosophy of life.

4. a. I am much less concerned about death than those around me.
   b. I am somewhat less concerned about death than those around me.
   c. I am somewhat more concerned about death than those around me.
   d. I am much more concerned about death than those around me.

5. a. I have a very strong desire to live on after death.
   b. I have a fairly strong desire to live on after death.
   c. I have a fairly weak desire to live on after death.
   d. I have no desire to live on after death.

6. a. Death reveals nothing to me about human existence.
   b. Death reveals little to me about human existence.
   c. Death reveals something to me about human existence.
   d. Death reveals a great deal to me about human existence.

7. Death hardly concerns me.
   a. I stongly agree.
   b. I somewhat agree.
   c. I somewhat disagree.
   d. I strongly disagree.

8. There is too much living to do for me to worry about death.
    a. I strongly agree.
    b. I somewhat agree.
    c. I somewhat disagree.
    d. I strongly disagree.

The alternatives for the items in the questionnaire were varied with respect to degree of death concern so as to minimize response set. Each item was scored on a 1- to 4-point scale with 1 given for the response least manifesting death concern and 4 for a response of maximal preoccupation. Thus, the lowest possible score on the questionnaire was 8, and the highest possible score 32. The actual range of scores obtained was from 8 to 31. The split-half reliability coefficient for the questionnaire was .82 after application of the Spearman-Brown formula.

On the basis of this questionnaire, the highest and lowest quartiles were selected for study. The lowest quartile consisted of students with scores of 16 or lower on the questionnaire, while the highest quartile consisted of students with scores of 25 or more on the questionnaire. One month later these students were contacted and told they had been randomly selected to participate in a study of cognitive processes. Five subjects in each group, however, were unable to participate in the study which reduced the sample to 14 subjects in the high-death-concern group and 14 subjects in the low-death-concern group.

Subjects were then seen individually and given the Picture Arrangement subtest of the WAIS (Wechsler, 1958). Following this, the four story-completion roots used by Wallace (1956) were administered. The four roots were stated verbally by the experimenter and read as follows:

1. At three o'clock one bright sunny afternoon in May, two men were walking near the edge of town.
2. Ten o'clock one morning, Al met his friend Jerry near the center of town.
3. Joe is having a cup of coffee in a restaurant. He is thinking of the time to come when . . . .
4. After awakening, Bill began to think about his future. In general he expected to . . . .

For each of these roots the subject was asked to make up a story. The stories were scored for the amount of time transpiring in the stories. Where this was not clear, the subjects were asked how much time had elapsed. After the administration of the stories, the Vocabulary subtest of the WAIS was given. This was done to obtain a measure of intelligence to use as a baseline when comparing scores on the Picture Arrangement subtest. The

Vocabulary subtest has been found to be the best single subtest for the estimation of general intelligence (Wechsler, 1958). After the administration the subjects were asked what they thought the experiment was about. None of the subjects was aware of any connection between the study and the death-concern questionnaire which had been completed 1 month earlier.

The Vocabulary subtest was scored according to standard WAIS procedure as was the Picture Arrangement subtest, and raw scores were converted to WAIS scaled scores. Each of the four story roots was ranked separately for extension for all the subjects, and this scoring of the stories was done without knowledge of the subjects' scores on the death-concern questionnaire. A rank of 1 was given for the story with the shortest extension and a rank of 28 for the story with the longest extension. Since prior research (Kastenbaum, 1961; Wallace, 1956) indicated that Roots 1 and 2 are different from Roots 3 and 4 in that they are more structured and involve an interpersonal situation, Roots 1 and 2 were combined and reranked as were Roots 3 and 4. Thus, six sets of ranks from 1 to 28 were obtained. The high- and low-death-concern groups were compared on these sets of ranks by the Mann-Whitney test (Siegel, 1956).

RESULTS

The average scaled scores on Vocabulary for the high- and low-death-concern groups were identical: 15.43. As hypothesized, however, on the Picture Arrangement subtest the average scaled score for the high-death-concern group was 10.36, while the average scaled score for the low-death-concern group was 11.71. This difference was significant at less than the .05 level using a one-tailed t test. These results suggest that death concern is related to less anticipation and a foreshortened time perspective. The equal scores on the Vocabulary subtest indicate that the differences between the groups on Picture Arrangement are not simply a function of differences in general intelligence.

The Mann-Whitney test was used to compare the high- and low-death-concern groups on the stories. For all story roots, the low-death-concern group tended to tell stories with a longer extension than did the high-death-concern group. This trend, however, only reached signficance for Roots 3 and 4 combined. The results of this analysis are presented in Table 1. These findings are consonant with the difference between the high- and low-death-concern groups on Picture Arrangement and again indicate, as hypothesized, a relationship between heightened death concern and a diminished FTP.

DISCUSSION

The results of this study indicated that heightened death concern is related to a foreshortened time perspective. People who report that they are highly concerned or preoccupied with death seem to live more in the present than in the future. Since the data are essentially correlational, they do not explain how these two aspects of experience are related. Several possibilities may be considered.

The first possibility, and the one which led to this study, is that death concern is the result of one's temporal organization of experience. For Bergson, the person who

TABLE 1

Scores of High- and Low-Death-Concern Groups on Story Extension and On the WAIS Vocabulary and Picture Arrangement Scales

	Mean			
	High (N=14)	Low (N=14)	*z*	*p* (one-tail)
Story extension				
Story 1	12.57	16.43	1.24	n.s.
Story 2	13.43	15.57	.69	n.s.
Stories 1 & 2	13.39	15.61	.71	n.s.
Story 3	12.25	16.75	1.45	.07
Story 4	12.29	16.71	1.43	.08
Stories 3 & 4	11.50	17.50	1.93	.03
WAIS subtests				
Vocabulary	15.43	15.43	$t(26)$ = --	n.s.
Picture Arrangement	10.36	11.71	$t(26) = 1.78$	$< .05$

Note. -- Scores for story extension are ranks, and the scores for WAIS subtests are scaled scores.

anticipates the future transcends himself and participates in the future of mankind with little concern about his own death. A mor prosaic, though equally plausible, alternative is that people who plan far into the future are not highly concerned about death because it is perceived as remote. People who live more in the present may not see death as so remote because they have not fill their future time with activities and goals. Such a hypothesis suggests future research into individual methods of coping with anticipated danger in the near distant future.

A second possibility is a causal relationship in the other direction. It may be that people who are concerned about death feel less rooted in the world and hence are unable to engage in practical planning for the future. Lifton (1963) pointed out that the encounter with death may produce a loss of faith in the structure of existence and a loss of confidence in human soci ties. People less concerned with death would be more free to utilize their energies in coping with the world's challenges since they feel more at home in it. Finally, there is the possibility that both foreshortened time perspective and death concern are the results of a third factor. One such third factor might be depression or despair. Erikson (1950) discussed fear of death as a manifestation of despair, Straus (1947) related loss of a sense of futurity to disruption of a sense of becoming arising out of despair. Thus, both death concern and foreshortened time span may reflect underlying despair.

It is relevant at this point to mention some incidental data collected in another study involving many of the same subjects. The Allport, Vernon, and Lindzey (1951) Study of Values was administered to 11 of the high-death-concern subjects and 10 of the low-death-concern subjects. Significant differences were obtained between these two groups on the Theoretical and Religious values. The mean Theoretical score was 48.8 for the low-death-concern group and 42.2 for the high-death-concern group. This difference was significant at less than the .10 level (two-tailed). The mean score on the Religious value was 25.7 for the low-death-concern group and 35.3 for the high-death-concern group. This was significant at less than the .02 level (two-tailed). These findings offered further support for the position that these two groups were quite different psychologically.

A comparison was also made of the college grades and college entrance board scores of the high-and low-death-concern groups. There was no significant difference between the two groups on the quantitative aptitude score ($\bar{x}$ = 696, 707, but the high-death-concern group did have significantly higher ($p<.05$) verbal aptitude scores ($\bar{x}$ =658,601) and college grades (79.69, 75.14).

The significantly higher grades and verbal aptitude of the high-death-concern group is difficult to understand. These differences, however, do not seem to be related to the question of a lowered FTP in the high-death-concern group. It seems likely that if higher verbal aptitude were to have any effect, it would increase rather than decrease FTP and the Picture Arrangement score.

Special attention must be directed both toward the method of assessment and the type of subject utilized in this study. Death concern was measured with a self-report questionnaire and consequently represents the conscious level of awareness of the subjects. It is also likely that the questionnaire evoked a cognitive rather than an affective response from the subjects. The meaning of death for each individual was not considered. The meaningful results obtained suggest that death concern may be used as a meaningful variable without regard to the very personal meanings death has for each person. The study was conducted with a homogeneous group of undergraduates, and the obtained relationship may therefore be limited to male, young adults of high intellectual ability and educational attainment. Further research is necessary for generalization of these findings to other populations.

It must also be noted that the obtained relationship between death concern and FTP was found primarily with Story Roots 3 and 4. These roots differ from Roots 1 and 2 in two ways. They do not anchor the story at a particular moment in time and do not involve an interpersonal situation. Since Roots 3 and 4 are thus less structured, the subject has more freedom to respond with his own characteristic mode of temporal organization.

The present study suggests areas for future research. The fact that high-low-death concern subjects showed different patterns of temporal organization suggest that the latter may be an important ego function which determines the form and style of the individual's interaction with the environment. As such, it should be investigated more thoroughly. Another possibility for research is the relationship between death concern and cultural values. Since American society tends to suppress concern about death, persons manifesting such concern reflect a degree of independence from the cultural norm. Finally, Murphy (1959) stated that there is a need to face death and a need to turn away from it. There should be many personality differences between those who are preoccupied with death, those who face it realistically, and those who turn away from it.

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Study B:

The WAIS Picture Arrangement Subtest As a Measure of Anticipation[1]

One of the most promising developments in the empirical investigation of temporal experience in recent years has been the investigation of future time perspective. Although several dimensions of future time perspective have been differentiated (Kastenbaum, 1961) most of the empirical research has been concerned with future extension which is a measure of how far an individual extends his thinking into the future. The impairment of future extension in psychopathology has been extensively discussed with respect to impulse disorder (Barndt and Johnson, 1955; Levine and Spivak, 1957; Roth and Blatt, 1961), depression (Straus, 1947), and schizophrenia (Wallace, 1956).

A standard procedure which has been used to measure future extension has involved the scoring of fantasy productions. Thus, LeShan (1952) asked his subjects to tell stories and these stories were scored for future extension. Barndt and Johnson (1955) and Wallace (1956) developed a more standardized method by introducing story roots. All subjects were given identical story roots and asked to continue the stories from there. Most recently, Epley and Ricks (1963) developed a procedure for scoring prospective span (future extension) and retrospective span (past extension) in TAT stories.

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[1] This study was conducted by Louis S. Dickstein and Sidney J. Blatt.In the Journal of Projective Techniques and Personality Assessment, 1967,31, 32-38.

These procedures have been used to investigate the relationships between future extension and social class (LeShan, 1952), frustration tolerance (Ellis, Ellis, Mandel, Schaeffer, Sommer, & Sommer, 1955), optimism and academic achievement (Teahan, 1958), interpersonal relations and emotional stability (Davids and Parenti, 1958), academic achievement, anxiety and emotional involvement with others (Epley and Ricks, 1963), and death concern (Dickstein and Blatt, 1966). These procedures have also been used to investigate future extension in schizophrenia (Wallace, 1956), delinquency (Barndt and Johnson, 1955) and old age (Kastenbaum, 1963). Although these methods have led to significant research, they are limited in application to subjects with verbal facility and the capacity and willingness to construct a story. There is a need for procedures to measure future extension which are non-verbal.

Rapaport, Gill and Schafer (1946) suggest that the Picture Arrangement (PA) subtest of the Wechsler Adult Intelligence Scale (WAIS) may be such a measure. They maintain that the capacity to place a "cartoon" sequence in meaningful order requires "planning ability" and "anticipation". The capacity to understand the cause and effect relationship between a series of discrete pictures seems to reflect a capacity to anticipate or understand a sequence which extends into the future. There is obviously a great difference between arranging a series of pictures into a sensible sequence and planning in everyday life. Nevertheless, a sense of continuity is dependent upon the capacity to anticipate from one moment to the next. It is the sense of anticipation which allows one to integrate and understand a complex array of stimuli and to organize them into a related and coherent sequence. If this capacity for anticipation is lacking, each event occurs in isolation and there is no organization or continuity. The PA subtest, in limited form, seems to reflect this capacity to anticipate the consequences of initial acts upon subsequent events. Rapaport et al. (1945) report marked relative impairment of the PA subtest in schizophrenia, impulse disorders, and psychotic depressions. It is impressive that the three clinical groups reported by Rapaport, et al.,as having important PA scores are the same groups which independent research, theory and clinical observations have indicated as having impaired future extension.

As a preliminary attempt to test the hypothesis that the PA subtest is, in part a measure of anticipation and planning, data gathered as part of a prior study on death concern and temporal experience (Dickstein and Blatt, 1966) were reanalyzed. As part of this earlier study 28 undergraduate students in an introductory psychology course had taken the Vocabulary and PA subtests of the WAIS and had told stories elicited by the story roots developed by Barndt and Johnson (1955) and Wallace (1956) to measure future extension. The stories told to these story stems were scored for amount of time transpiring in the action of the narration. The 28 Ss were divided into two groups of 14 on the basis of their PA scores. The High PA group told stories with greater future extension to root 3 (p=.084) and to root 4 (p=.012) and to roots 3 and 4 combined (p=.011). There were no significant differences between the two groups on roots 1 and 2 separately or combined. Roots 1 and 2, and 3 and 4, were combined separately because prior research (Kastenbaum, 1961; Wallace, 1956) has indicated that roots one and two are different from roots three and four in that the former are more structured and involve an interpersonal situation.

These findings suggest that PA performance is related to future extension but this conclusion could only be considered as suggestive, however, since the High PA group had a significantly ($p < .05$) higher Vocabulary score than the Low PA group. Thus, the difference in future extension could be, at least in part, a function of this higher Vocabulary score of the High PA group. To evaluate this possibility further, the 28 Ss were redivided into high and low Vocabulary groups and these two groups did not differ significantly on future extension for any story roots individually or combined.

These preliminary findings suggested support for the hypothesis that the PA subtest of the WAIS is, in part, a measure of anticipation. It was difficult, however, to generalize on the basis of this sample because the subjects were a select sample having been chosen from the highest and lowest quartiles on a measure of death concern and furthermore, the subjects were all male college students of high intelligence. Because of the limitations on generalization imposed by the nature of the sample and the question raised by a significant difference between the High and Low PA groups on Vocabulary, a second test of the hypothesis was undertaken with a different sample.

Method

Test records of adult patients having conspicuously high or low PA scores were selected by an independent judge from clinical files. The criterion for the selection of records for the High PA group was a PA scaled score that was either the highest or second highest subtest of the WAIS, and the converse criterion was used to select the Low PA group. The subjects were selected so that the groups were matched on age and on Verbal and Full Scale IQs and included hospitalized and clinic psychiatric patients who varied in diagnosis from neurosis through psychosis but none of whom showed evidence of organically based difficulties. Eighteen records with high PA scores (eight males and ten females) and 18 with low PA scores (eight males and ten females) were chosen, yielding a total of 36 records.

As part of the clinical battery, all _S_s had been given the WAIS and most of the subjects had been given all of the following TAT cards in the same sequence: 1, 5, 15, 14, a line drawing of two old men from the original Murray series, 10, the Picasso "La Vie" card from the original Murray series, 13 MF, and 12 M. Prospective and retrospective span scores for the TAT stories were obtained using the scoring system eveloped by Epley and Ricks (1963)[2]. In this scoring system, he story told to each card is rated for prospective and etrospective span on a ten point scale. The scale is as ollows:

"1. Span less than hour.
2. Span greater than hour, less than day.
3. Span greater than day, less than week.
4. Span greater than week, less than month.
5. Span greater than month, less than half year.
6. Span greater than half year, less than year.
7. Span greater than year, less than four years.
8. Span greater than four years, less than decade.
9. Span greater than decade, less than life (career).

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[2] Some of the patients have not been given all of these ine cards. The average number of cards administered was .8 for the High PA male group, 8.3 for the High PA female roup, 8.6 for the Low PA male group, and 8.7 for the Low A female group.

10. Life Span." (Epley & Ricks, 1963)

The same scale is used for both prospective and retrospective span. For stories with a time span exactly at the border between scale values (e.g., exactly one month), the convention was adopted of scoring the story at the higher value. This scale also includes a zero score for a lack of time span where the story does not extend beyond the present moment.

Stories are only scored for prospective and retrospective span if a person or group performing realistic acts is portrayed. Consequently, some of the stories told by subjects were unscorable. The average number of scorable stories was 6.1 for the High PA male group, 5.3 for the High PA female group, 5.1 for the Low PA male group, and 7.0 for the Low PA female group. Prospective and retrospective span were scored without knowledge of the WAIS scores of the subjects. A mean prospective span score and a mean retrospective span score were obtained for each subject based upon all scorable stories. Epley and Ricks (1963) report inter-rater reliability coefficients of .66 for prospective span and .74 for retrospective span with an N of 23. Nine of the 36 TAT protocols of the present study were selected at random and scored by a second rater and this provided some additional data on the reliability of the scoring system. The product moment correlation between the two scorers for prospective span (N=9) was .872, while the product moment correlation between the two scorers for retrospective span (N=9) was .916. Both correlations are significant at the .01 level, two tailed. The difference between the High and Low PA groups on prospective span was evaluated by the _t_ test for independent groups.

Results

The mean age, WAIS Verbal, Performance and Full Scale IQs and prospective and retrospective span scores are presented in Table 1. There were no significant differences between High and Low PA groups in age, or in WAIS Full Scale or Verbal IQs. Since _S_s were selected on the basis of high and low scores on one of the Performance scales, it was expected that the High PA group would have a higher Performance IQ. The two groups did differ significantly on Performance IQ and this difference was due primarily to the difference between the groups on the PA subtest. The only Performance subtest on which the High and Low PA groups differed significantly was Picture Arrangement. On the Verbal subtests, the only significant difference was on

Vocabulary with the Low PA group having a significantly higher Vocabulary score than the High PA group. This difference, however, could not account for findings which would support the hypothesis that PA is a measure of future extension for, if anything, one would expect the group with the higher Vocabulary score (the Low PA group) to manifest a longer prospective span.

TABLE 1

Mean Age, WAIS Verbal, Performance, and Full Scale IQs, and Prospective and Retrospective Span Scores of High and Low PA Groups

	Mean		*t* (df=34)	*p* (1 tailed)
	High PA (N=18)	Low PA (N=18)		
Age	22.2	25.1	1.19	N.S.
WAIS				
Verbal IQ	111.4	115.0	.80	N.S.
Performance IQ	113.3	102.7	2.90	$< .01$
Full Scale IQ	112.9	110.3	.61	N.S.
PA Scaled Score	15.39	7.94	---	$< .01$
Time Span				
Prospective	3.22	1.76	2.47	.012
Retropective	2.73	2.35	.71	N.S.

As presented in Table 1, there were no significant differences between the High and Low PA groups on retrospective span. The groups did differ, however, on prospective span. The mean prospective span score for the total High PA group was 3.22 while the mean prospective span score for the total Low PA group was 1.76 and this difference is significant at the .012 level, one tailed.[3]

High PA Ss ranged on average prospective span score from .50 to 8.80 with an average prospective span between one day and one week (scaled score of 3.22). The range of average prospective span scores for Low PA Ss was from .00 to 3.57 with a mean of 1.76 which is less than one day. To state the difference between High and Low PA Ss somewhat differently it may be helpful to note that 8 of the 18 High PA Ss had an average prospective span score of 3 or greater while only 2 of the 18 Low PA Ss have scores of 3 or more. To illustrate this difference stories told by 2 High PA Ss and 2 Low PA Ss to Card I of the TAT are presented below:

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[3] Differences between the High and Low PA groups approached significance in both the female (p=.071, one tailed) and male samples (p=.057, one tailed).

High PA:

W. - a 22 year old male college student, in-patient.

Card I - 20" This is a kid who has been brought up from birth to try to become a musician. He has been sort of ingrained with the idea that he should become a - well - great violinist. His present reactions are that he's confused as to whether he should or not. Eventually he will destroy the violin, go into a bar and become a honkey-tonk player. What else do you want on this? (2'15") (How is he feeling?) He -- at the present time -- he sort of despises the thing but feels he should because his parents tell him he should.

Prospective span score = 9

B. - 22 year old pregnant, unmarried art student, in-patient.

Card I - 25" A young gentleman who was given violin by parents because they were very musical people. He spent lots of time learning to play, he likes it -- he's at point where he's played so many pieces so many times that he wants to compose some pieces of his own. Sitting with eyes closed, thinking what he's gonna compose. Then (smiles) goes out and becomes very famous composer with lots of success and glory and money -- It's hard with picture in front of you -- you tend to think of picture as climax of story. (2'15") I _hate_ pictures like

High PA:

W. - a 22 year old male college student, in-patient.

Card I - 20" This is a kid who has been brought up from birth to try to become a musician. He has been sort of ingrained with the idea that he should become a - well - great violinist. His present reactions are that he's confused as to whether he should or not. Eventually he will destroy the violin, go into a bar and become a honkey-tonk player. What else do you want on this? (2'15") (How is he feeling?) He -- at the present time -- he sort of despises the thing but feels he should because his parents tell him he should.

Prospective span score = 9

B. - 22 year old pregnant, unmarried art student, in-patient.

Card I - 25" A young gentleman who was given violin by parents because they were very musical people. He spent lots of time learning to play, he likes it -- he's at point where he's played so many pieces so many times that he wants to compose some pieces of his own. Sitting with eyes closed, thinking what he's gonna compose. Then (smiles) goes out and becomes very famous composer with lots of success and glory and money -- It's hard with picture in front of you -- you tend to think of picture as climax of story. (2'15") I hate pictures like that (?) It's real sweet ... (Boy feel here?) Thinking about at this point ... he's composing first tune in his head, very involved in the feeling of music and naturally thinking about it.

Prospective span score = 9

Low PA:

H. - 23 year old male, inpatient.

Card I - 10" Coughs. 40" Apparently here is a young boy who has been presented with a violin some time ago by his parents . . . and has been taking lessons on the violin and has probably been teased by his friends on the fact that he's taking violin lessons . . . and has been told he has to practice a certain amount of time each day on the violin, and from the dubious way he's looking at the violin . . . the weather outside has been too nice to spend in practicing on an instrument . . . and before too long some friends will appear at the door or the window and cajole him with very little effort to join them in a game of baseball. He will do this if no one is home.

Prospective span score = 1

that (?) It's real sweet ... (Boy feel here?) Thinking about at this point ... he's composing first tune in his head, very involved in the feeling of music and naturally thinking about it.

Prospective span score = 9

Low PA:

H. - 23 year old male, inpatient.

Card I - 10" Coughs. 40" Apparently here is a young boy who has been presented with a violin some time ago by his parents . . . and has been taking lessons on the violin and has probably been teased by his friends on the fact that he's taking violin lessons . . . and has been told he has to practice a certain amount of time each day on the violin, and from the dubious way he's looking at the violin . . . the weather outside has been too nice to spend in practicing on an instrument . . . and before too long some friends will appear at the door or the window and cajole him with very little effort to join them in a game of baseball. He will do this if no one is home.

Prospective span score = 1

N. - a 43 year old married female out-patient.

Card I - Sort of like boy who is taking violin lessons. Mother just scolded for not studying and he's bored with whole thing. He seems -- didn't seem too happy about it -- probably grows up not liking music.

Prospective span score = 0

In the study of Epley and Ricks (1963) a significant correlation of .44 was obtained between prospective and retrospective span. In the present study, however, the correlation between prospective and retrospective span was different in the High and Low PA groups. The product moment correlation between prospective and retrospective span was .700 ($p < .01$, two tailed) for the High PA group and only .186 (N.S.) for the Low PA group.[4] The difference between these correlations approached significance ($p=.063$, two tailed).

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[4] If High and Low PA groups are combined and treated as a single sample, the correlation between prospective and retrospective span is .544.

Discussion

The results of the present study, as well as the findings of the pilot study, offer support for the hypothesis that the Picture Arrangement subtest of the WAIS is a measure of the capacity for anticipation and planning. This finding is of significance in view of the importance of anticipation as an ego function. Arieti (1947) points out that anticipation, "is the capacity to foresee or predict future events even when there are no external stimuli which are directly or indirectly related to those events" (p. 471). He notes that the majority of man's actions are directed by anticipation. Similarly, Hartmann (1958, p. 43) writes, "The reality principle .... implies something essentially new, namely, the familiar function of anticipating the future, orienting our actions according to it, and correctly relating means and ends to each other." Anticipation is the central mediator of goal directed purposeful behavior and it would be of great value to have a non-verbal measure of this function. It is relevant to note that the pilot study and present study included male and female subjects, of high and average intelligence, from normal and clinical populations. Thus, the interpretation of the PA subtest as a measure of anticipation appears to be relevant to a wide range of populations. It must be noted, however, that in both studies the subjects were primarily young adults and future investigation is necessary for confirmation of the hypothesis with an older sample and with children.

The significant correlation between prospective and retrospective span in the present study and in the study of Epley and Ricks (1963) suggests that there might be a general dimension of time perspective extending into the past as well as into the future. Alternatively, the significant correlation might reflect common method variance. However, the differences between the correlation of prospective and retrospective span in the High and Low PA groups approaches statistical significance. The low correlation between prospective and retrospective span in the Low PA group may be a function of the restricted range of scores these subjects obtain on these variables. In any event the differences between the correlations of prospective and retrospective span in High and Low PA groups suggests that organization of temporal parameters may have important individual variations, and this may be an important area for subsequent research.

In the pilot study, differences in extension between the High and Low PA groups were much more prominent for stories three and four than for stories one and two. Wallace (1956) has pointed out that stories three and four are much less structured than are stories one and two. Consequently, they would seem to provide a more valid measure of personal extension. Again, more research is necessary to clarify the differences between future extension measured by roots one and two, and future extension measured by roots three and four.

Recent research with measures of future extension suggests that time perspective is a dimension of motivational and affective as well as cognitive significance. Thus, Dickstein and Blatt (1966) found that students who were highly concerned with death scored significantly lower on a measure of future extension and on the PA subtest than students with little concern about death. Epley and Ricks (1963) found that students with high prospective span showed less anxiety and were more empathic than students with short prospective span. These results are promising and suggest the need for more research on future extension and on temporal parameters generally, for there is suggestion from a number of different vantage points that the perception, utilization and representation of time may be a central dimension in personality organization.

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Study C:

Punctual and Procrastinating Students: A Study of Temporal Parameters[1]

Time as a fundamental rhythm expressed, in part, in the cyclical biological functions of the organism is a basic dimension of reality to which man must accommodate. Psychological maturity requires ever increasing adherence to, and integration of, temporal regularities. Time can be experienced as confining, or it can be used to regulate experiences, or it can give order, continuity, and purpose to existence. Man's position vis-a-vis time, therefore, can reflect interpersonal mutuality and cooperation, a revolt against social regulation, and/or a passive adherence to external constraints (Fraisse, 1963). Temporal parameters such as the capacity for delay and the ability to anticipate, plan and understand means-end relations are essential features of secondary process thinking. Anxiety as a signal function can exist only with anticipation of possible future events. Delay and anticipation are essentail components of the shift from the pleasure principle to the reality principle (Hartmann, Kris and Lowenstein, 1964). Attitudes toward time and the use and experience of time, such as the relative capacity for delay, anticipation and planning are basic features of general modes of adaptation or character style.

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[1] This study was conducted by Sidney J. Blatt & Paul Quinlan and is currently in press in the Journal of Consulting Psychology.

The study of time as a psychological variable has been of three general types: attitudes toward time, time estimation and time perspective. Two recent reviews (Fraisse, 1963; Wallace and Rubin, 1960) provide excellent summaries of the research on temporal constructs. These reviews also summarize much of the literature on temporal experiences in psychopathology and clearly indicate the pivotal role that temporal constructs have in psychological functioning.

The present study is concerned primarily with time perspective, i.e., the capacity to relate current experiences to a historical past and to an anticipation of the future. Of particular interest is this study are the individual differences in the capacity for anticipation and planning and the relationship of these differences to other psychological functions. Although time perspective has been studied through a variety of techniques, there is considerable agreement about the importance of time perspective in psychological organization and development, and its impairment in psychopathology (Arieti, 1947; Du Bois, 1954; Roth, 1961; Roth and Blatt, 1961; Schilder, 1936; Wallace and Rabin, 1960). Time perspective as a psychological parameter has a prospective and a retrospective dimension, but it is particularly prospective span which is essential for purposeful, goal-directed behavior.

Individual differences in future time perspective (FTP) and in the capacity for planning and anticipation can be particularly vivid for the undergraduate instructor. Most students are punctual in meeting course requirements, but, invariably, there are a few who delay until the last possible moment and frantically rush to meet deadline or request a time extension. This phenomenon offers an excellent behavioral criterion of the capacity for anticipation and planning which can be used to study individual differences in time management and to test assumed measures of future time perspective and the capacity for anticipation and planning. A comparison of punctual and procrastinating students would not only be valuable in studying the psychological processes related to time management but it could also raise an important methodological issue about a potential source of individual differences in demographically similar subjects and stress the need, when using volunteers in psychological research, for controlling the variation in the time when a subject participates in an experiment.

METHOD

A requirement in the year-long introductory psychology course at Yale is to participate in a psychological experiment for two hours each semester. Fifteen subjects who, within the first week of the fall semester of 1963 had completed their requirement to participate in an experiment, were selected as the punctual _S_s or "Early Volunteers" (EV) for the present study. One of these _S_s was unable to participate, however, because of illness.

Fifteen "Late Volunteers" (LV) were obtained during the last two weeks of the first semester by contacting students who had not yet made any arrangements to meet the course requirement for participation in a psychological experiment. Early and late volunteers, selected on the basis of their behavior in meeting a course requirement during the first semester were seen individually, and in random order, during the beginning of the second semester. All Ss were either in the freshman or sophomore class and had selected the psychology course to meet the requirement of an introductory course in the social sciences.

To assess the general intellectual level of the two groups, EV and LV Ss were compared on the Information and Vocabulary subtests of the WAIS and on College Entrance Examination Board (CEEB) scores. The WAIS Information and Vocabulary subtests were selected because they are untimed and have the highest correlation of all WAIS subtests with Full Scale IQ (Wechsler, 1955). Student records were available so the two groups were also compared on college grades and number of extra-curricular activities.

In addition to these control variables, the two groups were compared on a variety of measures of temporal parameters including the Picture Arrangement (PA) subtest of the WAIS, story stems used to assess Future Time Perspective (FTP) (Barndt and Johnson, 1955; Wallace, 1956), a death concern questionnaire (Dickstein and Blatt, 1966) found to be related to FTP, and the Stroop Color-Word Test (Stroop, 1935).

The WAIS Picture Arrangement subtest was of particular interest since Rapaport, Gill and Schafer (1945) suggested that this subtest in requiring subjects to place cartoon frames in meaningful sequences, requires a capacity for anticipation and planning. Rapaport, et al. assumed that the capacity to understand the cause and effect relationships between a series of discrete pictures requires the capacity to anticipate from one moment to the next. When this capacity for anticipation is relatively impaired, each event occurs in isolation and there is little organization or continuity.

The measurement of Future Time Perspective, (FTP) is a relatively recent development and one of the early empirical studies in this area was that of LeShan (1952) who related FTP to social class. LeShan developed a procedure to measure FTP in spontaneously told stories, and this technique was modified into a story completion procedure by Barndt and Johnson (1955) and by Wallace (1956). In the story completion procedure four story roots are presented verbally (e.g., 1. At three o'clock one bright sunny afternoon in May, two men were walking near the edge of town...). For each root Ss were ssked to make up a story and when the amount of time transpiring in the action of the narration was not clear, Ss were asked how much time had elapsed in their stories. Each of the four story roots was scored for FTP. Prior research (Kastenbaum, 1961; Wallace, 1956) indicated that roots one and two are different from roots three and four in that they are more structured, the story being anchored at a particular point in time and involving an interpersonal situation.

A Death Concern Questionnaire, developed in an earlier study (Dickstein and Blatt, 1966), is an eight item questionnaire designed to assess the degree of preoccupation with death. Death concern was found to have a significant negative relationship to FTP and to performance on the WAIS PA subtest.

The Stroop Color-Word Test (Stroop, 1935) was also included in the study because of an assumed relationship between the capacity for delay and the development of a time sense (Freud, 1920, 1925). Part III of the Stroop Test has been considered as requiring the capacity to inhibit the overlearned, readily available and compelling response to the printed word while attending to the color (Gardner, Holzman, Klein, Linton and Spence, 1959; Stroop, 1935). EV and LV Ss were compared on all three parts of the Stroop Test and on an "Interference score" (Gardner et al., 1959). It was expected that LV Ss would be more distractable and therefore would have a higher interference score on the Stroop Test.

Though it was expected that the major differences between EV and LV Ss would be on temporal parameters, it seemed possible that the groups could also differ in their tendency to conform. The LV Ss might be more actively defiant of limits and less tolerant of authority, while EV Ss could be more submissive and accepting of authority and authoritarian structure. As a first attempt to test this hypothesis, the groups were given an abbreviated form of the California F Scale. Also two of the Guilford measures of divergent thinking (Guilford, 1957; Getzels and Jackson, 1962) were given to the groups to test for differences in the tendency to think in unusual and unconventional ways.

All testing was done by the same E in an individual testing session about 2 hours in length. EV and LV Ss were seen in random order and testing and scoring was done blind. All Ss were asked what they thought the study was about and none of them was aware of its nature.

Results

EV and LV Ss were compared on a number of demographic variables and there were no significant differences between the two groups on the WAIS Vocabulary and Information subtests, the Mathematics and Verbal CEEB scores, college grades, and the number of extra-curricular activities that Ss participated in during the semester that they were selected for study.

Table 1 presents the comparison of EV and LV Ss on measures of anticipation and planning, future time perspective, and death concern. The EV, as compared to the LV Ss, reported significantly less preoccupation with death, told stories which extended further into the future and had significantly higher WAIS PA scores. It is possible that the difference between the two groups on the PA subtest was not a function of differences in the assumed capacity for anticipation and planning

Table 1

A Comparison of Early and Late Volunteers on WAIS subtests and Measures of Death Concern and FTP.

	Mean		*t*	*p* (1 tail)
WAIS	E V (*N*=14)	L V (*N*=15)		
Information	14.64	14.80	0.10	NS
Vocabulary	15.14	15.13	0.02	NS
Picture Arrangement	12.79	10.20	2.93	$<.01$
Death Concern	19.93	23.50	1.92[a]	$<.03$
Future Time Perspective[b]			*z*	
Story 1	11.64	18.13	3.36	$<.01$
Story 2	11.61	18.17	3.38	$<.01$
Story 3	15.75	14.30	-.46	NS
Story 4	16.79	13.33	-1.09	NS

[a] The Death Concern Questionnaire was inadvertently not given to 2 LV *Ss*, therefore, the *df* for this measure is 25.

[b] Scores on the Story Stems are based on ranks, and therefore the comparison of means is expressed in the unit normal deviate (*z*) rather than as *t* test.

(Rapaport, et al., 1946) but that EV Ss worked more rapidly and the differences between the two groups were a function of time bonuses. Examination of the PA performance, however, indicated that the significant difference between the two groups was primarily a function of a greater number of incorrect sequences in the LV group and only secondarily a function of time bonuses. The LV Ss had a total score of 28 incorrect sequences as compared to only 9 incorrect sequences for the EV group, and this difference was statistically significant ($p < .05$). In terms of points gained from time bonuses, the LV group received a total of 12 time bonuses as compared to a total of 20 for the Ev group, but this difference was not statistically significant. In addition, no points were lost in either group because of exceeding time limits.

An interesting difference was noted in the performance of EV and LV Ss on individual items of the PA subtest. The EV Ss were generally more successful on each item of the PA subtest but there was one reversal in this pattern and this occured on the sixth item (the Flirt Sequence). The correct (four points) sequence on this item has the Little King in a car, seeing an attractive woman carrying a bundle, ordering his chauffeur to stop, getting out of the car and walking with the woman, carrying her bundle on his head (JANET). Wechsler (1955) gives part credit (two points) for two alternate arrangements, one where the woman walking is placed first in the sequence (AJNET) and the other where the woman is placed third in the sequence after the Little King has ordered the chauffeur to stop (JNAET). Eight of the fourteen EV Ss gave a two point sequence on this item and seven of these eight two point sequences had the woman placed third, after the King has told the chauffeur to stop (JNAET). In contrast, six of the fifteen LV Ss gave a two point answer to this item, but four of the six had the woman placed in the sequence (AJNET). Though EV Ss may have a more fully developed temporal organization and a greater sense of responsibility, the type of partial error on item six of the PA suggests that they may also be a formal, controlled, somber, ascetic group, who prefer to postpone or even avoid pleasure and satisfaction. The LV Ss, in contrast, may be a more spontaneous, labile, or even impulsive group who seek fun and pleasure.

Further support for the impulsivity and lability of LV Ss was seen on the Stroop Color-Word Test. As indicated in Table 2, the two groups did not differ significantly on Parts I, II, and III of the Stroop Test but the differences between the groups approached statistical significance ($p = .07$) on the "interference measure" (Part III/Part II). There were no significant differences between the two groups, however, on authoritarian values or the capacity for divergent thought.

TABLE 2

A Comparison of Early and Late Volunteers on Measures of Divergent Thinking and the Stroop and F Scale Measures.

	Mean		t	p (1 tail)
	E V (N=14)	L V (N=15)		
California F Scale	93.21	96.40	0.40	NS
Guilford Divergent Thinking				
Unusual Uses	30.43	29.80	0.13	NS
Word Association	42.93	42.53	0.28	NS
Stroop Color-Word Test[a]				
Part I	38.53"	39.33"	.37	NS
Part II	54.15"	53.54"	.21	NS
Part III	93.82"	102.68"	.94	NS
Interference Score	-5.12	+4.55	1.60	$<.07$

[a] One Ev S was not given the Stroop test and therefore the df for the Stroop is 26 rather than 27.

Discussion

The results clearly indicated that there are major psychological differences between punctual and procrastinating Ss; these differences were found primarily in temporal dimensions, such as the extent of future time perspective, the capacity for anticipation and planning, and a resistance to distractability. Punctual and procrastinating Ss also differed significantly on a questionnaire about the degree of concern about death.

The significantly higher death concern scores of the procrastinating Ss were consistent with earlier findings (Dickstein and Blatt, 1966) of a relationship between death concern and temporal parameters and with a recent report of the psychoanalysis of a patient with "chronic and intractable lateness" where one of the functions of the lateness was to ward off fears of death (Orgel, 1965). Though the relationship between procrastination, death concern and lower scores on Picture Arrangement could be a function of psychomotor retardation associated with depression rather than a primary relationship between death concern and time, the data of the study by Dickstein and Blatt (1966) do not support this interpretation. High death concern Ss gained only 10 points from time bonuses on the PA subtest as compared to a total of 11 time bonus points gained by the Low group; and no points were lost in either group for exceeding time limits. The significant difference on PA between high and low death concern Ss in this prior study was almost exclusively a function of the number of incorrect responses.

The significant difference found between EV and LV Ss on several of the story stems offered further support for the value of using fantasy productions in the study of temporal extension. Both the analysis of stories told to TAT cards (Epley and Ricks, 1963) or elicited by verbal stems (Barndt and Johnson, 1955; Wallace, 1956) have led to meaningful research in the area of FTP. It should be noted, however, that the significant difference found between EV and LV Ss occurred only in stories told to the first two stems. In the present study, the criterion of punctuality versus procrastination was defined in terms of a specific time deadline and within the interpersonal matrix of student and instructor. It is consistent, therefore, that the differences in FTP between the two groups should occur on stories told to stems one and two, i.e., the more structured, interpersonal stems. In contrast, differences in FTP between high and low death concern subjects occurred primarily on the less structured, non-interpersonal third and fourth stems (Dickstein and Blatt, 1966).

The significant difference found between punctual and procrastinating Ss on the WAIS PA subtest supports the assumption that PA assesses, at least in part, a capacity for anticipation and planning (Rapaport, et al., 1946). The ability to anticipate from one event or moment to the next on the PA subtest seems to assess a more general capacity to extend one's self into the future and to establish a sense of continuity so that effective planning can take place.

It is consistent that EV Ss, who have greater FTP and better anticipation and planning, should also experience relatively less interference and distraction on the Stroop test. The degree of distractability on the Stroop is in part a function of the capacity to delay and inhibit the more immediate response to the printed words so that the color of the ink can be named accurately and rapidly. Postponement or delay has been conceptualized as one of the early stages in the development of an understanding and utilization of time as an essential reality dimension. It is only through delay of immediate gratification that one is able to make initial discriminations in reality and to develop a capacity for anticipation and planning which is necessary to strive toward temporally more distant goals (Freud, 1911; Hartmann, 1958; Rapaport et al., 1946). The finding of the present study that punctual Ss with a more fully developed sense and use of time also experienced relatively less interference or distraction on the Stroop test offers support for the conceptualization that the capacity to delay or inhibit an immediate response is related to planning and anticipation.

The differences found in the present study between demographically similar EV and LV Ss indicate that the temporal sequence in which Ss are obtained for research can be a confounding factor in what initially appears to be a relatively homogeneous sample. Research conducted early or late in the semester seems to sample significantly different populations and ambiguous and even contradictory findings might be obtained, particularly if the variables of the study are related to temporal parameters. Similar methodological issues have been raised about sampling bias created by Ss who miss appointments or refuse to participate in a study (Abeles, Iscoe and Brown, 1954; Frey and Becker, 1958; Martin and Marcuse, 1958). The results of the present study indicate an even more subtle source of sampling bias and again raise the serious question about the advisability of using volunteers in relatively uncontrolled ways. Campbell and Stanley (1963), in discussing the problem of the representativeness of volunteer subjects in research, commented that "early volunteers are a biased sample, and the total universe 'sampled' changes from day to day as the experiment goes on, as more pressure is required to recruit volunteers, etc." (p. 194). Though random assignment of volunteers to treatment groups may equate treatment groups, randomization does not resolve the issue of representative sampling (Campbell and Stanley, 1963). The results of the present study indicated a wide range of psychological functions are related to the time of volunteering and clearly stress the need to be concerned about the issue of representative sampling when volunteers are used in research.

Thus far in this paper punctuality and procrastination have been viewed as a highly stable and enduring character trait. Individuals do seem to tend towards one pole or the other pole, but there is undoubtedly a considerable range in the consistency of an individual's tendency toward punctuality or procrastination. Further research should be devoted to studying other aspects of punctual and procrastinating subjects (such as the degree of negativism in procrastinating Ss or the overconformity of punctual Ss, the effect of a variety of situational contexts (such as positive and negative experiences) on such behavior, and the interaction between these individual and situational dimensions on temporal parameters. There are individuals who live primarily in the present and who see relatively little relationship between the present and their historical past or their future, and there are those who live in a complex temporal universe with continuity and purpose. These dimensions reflect fundamental qualities of an individual's existence, and they should become increasingly important dimensions in psychological theory and research.

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CHAPTER VIII

The Wechsler Object Assembly Subtest And Bodily Concerns[1]

When Wechsler originally developed the intelligence scales, he saw their primary function as a valid and reliable evaluation of global intelligence and only secondarily as a technique for personality assessment (Wechsler, 1944). With the development of ego psychology, however, intelligence has been more clearly conceptualized as an integral part of the total personality structure. One of the basic assumptions in psychoanalytic ego psychology is that cognitive processes, as expressed in a variety of problem-solving situations, reflect important dimensions of personality organization. Cognitive processes convey information about adaptive and defensive functions, levels of ego organization and the relative degree of control over the intrusion of more fantasy-determined and conflict-laden material into adaptive endeavors.

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[1] This study was conducted by Sidney J. Blatt, Joel Allison and Bruce L. Baker and was published in the Journal of Consulting Psychology, 1965, 29, 223-230.

The Wechsler intelligence scales, therefore, have come to be more than an assessment of levels of intelligence and are now considered as a means of assessing ego functions (Fromm, Hartmann, & Marschak, 1957; Rapaport, Gill & Schafer, 1946). The Wechsler scales present relatively neutral and highly structured situations, and the scales assess the relative integration and balance of a variety of ego functions such as memory, judgment, anticipation, planning, visual-motor integration, concept formation, attention, and concentration. As early as 1945, Rapaport, Gill, and Schafer presented an extensive discussion and rationale for the processes assessed by each of the scales of the Wechsler-Bellevue Intelligence Test. They related the organization of ego functions as seen in score patterns to more general adaptive endeavors and to the pathological impairments of these adaptive processes. Two recent reviews of the research literature on the Wechsler scales, however, generally conclude that even though assessing personality variables from intellectual functioning is an important avenue for psychological diagnosis, relatively few studies have been conducted in this area (Guertin, Rabin, Frank, & Ladd, 1963; Littell, 1960). It is surprising that so few attempts have been made to examine the relationships between personality organization and

and intellective processes and, more generally, to test and elaborate the ego psychological model and the clinical observations presented by Rapaport, Gill and Schafer.

With regard to the Object Assembly (OA) subtest, both Wechsler and Rapaport concur on its essential role as a test of visual-motor organization. They are less explicit, however, about the factors that can disrupt visual-motor functioning on the OA subtest. Some studies have examined the effects of aspects of personality organization on OA scores. These studies have related OA scores to anxiety (Griffiths, 1958; Hafner, Pollie, & Wapner, 1960; Matarazzo, 1955) or to brain damage (Balthazar, 1963; Fisher, 1958; Penfield & Miller, 1958), and the results are inconclusive and at times contradictory. The OA subtest has also been criticized as being highly unreliable. These criticisms, however, are made without consideration for the essential characteristics of the subject. Split-half reliability on a three- or four-item scale is a highly questionable procedure, and low reliability indicated by test-retest comparisons ignores the essential point that one of the major and unique aspects of the OA scale is that it demands a capacity for insight. Once one knows the nature of the object to be assembled, the psychological functions assessed by the subtest may be vastly different, and the scores, particularly through time credits, can be greatly enhanced.

The only reasonable reliability estimate, therefore, would be a correlation between alternate forms. In utilizing this scale in research or in clinical practice, particular attention must be given to whether the subject had been given the OA subtest before.

The purpose of the present study is to examine the relationship between concerns about body intactness and the visual-motor functioning on the OA subtest. In clinical practice, we have noted that personal conflicts and preoccupations about body intactness often intrude into the relatively impersonal and detached intellectual task presented by the OA subtest. For example, we noted that the OA subtest was markedly impaired in the Wechsler Adult Intelligence Scale (WAIS) of a 40-year old female patient who was reconstituting from an acute psychotic hypomanic reaction which had resulted after being told that she had breast carcinoma. Numerous other clinical examples, as well as incidental data of other published studies supported the hypothesis that impaired OA scores can reflect concerns about body intactness. Morrow and Mark (1955), for example, in a study of brain damage, compared the Wechsler protocols of brain-damaged patients with a normal control group. The normal control group consisted of 45 patients recuperating from minor surgery such as appendectomies and tonsillectomies with no history of brain damage or psychological difficulty. It seemed reasonable to assume that surgical patients should have some concern about body intactness, and in reviewing the subtest scores of this control group it was noted that the OA subtest was the third lowest mean score of the 11 Wechsler subtests. In this control group, the Performance scores were slightly higher than Verbal scores, which would indicate that there was no general diminution of energy on motor tasks as a function of hospitalization. A further preliminary test of the hypothesis of the present study was attempted by reconsidering the data presented by Rapaport, Gill, and Schafer. The data on "specific symptomatology" of the "hysteric" patients in the Rapaport volumes were examined, and those patients with clear indications of bodily concerns were selected. The scores on each of the Wechsler subtest were ranked, and the OA score was given a rank relative to the other subtests in these 15 protocols. In all but 3 protocols, OA was ranked below the median. Using the sign test, this difference is significant at p=.018 (one-tailed test). To determine if this finding could be attributed to an overall decrement in scores on the Performance subtests, the OA score was given a rank relative to the other four Performance subtests. Again, in 3 of the protocols OA, was above the median rank for the Performance subtests, and in 12 of the 15 protocols it was below the median rank. This finding is also significant at p=.018 (one-tailed test).

The present study was designed as a systematic attempt to evaluate a hypothesis drawn from general clinical impressions and from highly suggestive but tentative research findings; namely, that concerns about body intactness and integrity will be reflected in the Wechsler intelligence test by a subtest pattern in which the OA score is lower than the scores of many of the other subtests.

METHOD

Two procedures were utilized to test the hypothesis of the present study. First, a clinical psychologist, unfamiliar with the hypothesis of the present study, was asked to select from the files of a local child guidance clinic children who clearly expressed bodily concern since the time of referral and a group of children for whom bodily concerns were not believed to be a dominant issue. These cases were selected from an independent clinical agency with which the authors of the present study had no contact, and the cases were selected on the basis of the referral statement, intake interview, and/or therapy notes. The data of the diagnostic test battery were not used in the selection of the subtests. The Wechsler Intelligence Scale for Children (WISC) scores of the seven children with clear clinical indications of bodily concerns were compared with WISC scores of six children of a control group. These two groups were compared for absolute differences in scores[2] on the OA subtest and, also, for the extent of deviation of the OA score from the mean score of each subject.

The second test of the hypothesis of the present study was conducted by selecting from clinical files test records of adult patients who have either conspicuously low or high OA scores. The criterion for the group with OA scores was that the OA score was either the highest or the second highest subtest of the Wechsler protocol, and the converse criterion was used to select the group with low OA scores. The OA score had to be clearly among the highest or lowest two subtest scores, and if there were several other scores equal to the OA score, the record was not used. Twenty records with high OA scores (10 males and 10 females) and 20 with low OA scores (10 males and 10 females) were chosen, yielding a total of 40 records. The test records were chosen from clinical files by someone unfamiliar with the hypothesis of the study, and the cases included hospitalized and clinic psychiatric patients who varied in diagnosis from neurosis through psychosis but none of whom showed evidence of organically based difficulties. The records were selected with a view to minimizing differences in age and overall IQ. Also, since OA efficiency can be markedly facilitated by familiarity with the test stimuli, only those subjects who had never been given a WAIS before were used in the present study. Rorschach protocols of the group with high OA scores and that with low OA scores were scored by an independent judge for indications of bodily concern. Rapaport (1945) in discussing Rorschach content categories suggests that anatomical, blood, and sexual responses are all possible expressions of bodily or anatomical concern and preoccupation. One additional content category, the X-ray response, seemed also to reflect bodily concern, and therefore it was added as the fourth content category to the three already delineated by Rapaport. Thus, for each subject, the number of anatomical, blood, sexual, and X-ray responses were tallied as well as any expression of missing body parts; decay; disintegration; illness; death; or exaggerated, distorted, or grotesque body parts. The group with high OA scores and that with low OA scores were compared for the percentage of these indexes in their Rorschach records. The Mann-Whitney U test was used for these comparisons.

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[2] Scores, as discussed for the Wechsler scales, always refer to scaled scores, not raw scores.

RESULTS

The data presented initially in this section will compare the WISC scores of two groups of children: one group with clear indications of bodily concerns in their clinical records, and a comparable patient sample without any suggestions of such preoccupations and concerns. Table 1 presents the age, sex, WISC scores, and IQs for these two groups. The control subjects were, on the average, slightly older (11 months) and somewhat more intelligent (10 IQ points, Full Scale) than the experimental subjects. Because of large variances, however, neither of these differences is statistically significant.

Table 1 also presents the scores for the various WISC subtests for each member of the two groups. When the scores of the two groups were compared for each subtest, the differences between the two groups approached statistical significance only on the OA subtest. The children with indications of bodily concern had a lower OA score than did the control group (p=.057), and the differences between the two groups did not approach significance on any other subtest. The somewhat lower IQ of the bodily concern group, however, may have exaggerated the differences on the OA subtest. Also, a comparison of absolute score does not consider the OA score in relation to the total

WISC scatter of each individual. Thus, the deviation of the OA score from the total mean score for each subject was obtained, and the mean deviations of the OA scores for the experimental group and the control group were compared. The mean difference of 2.74 score points between the experimental group and the control group yielded a t=.209 (11 df) which is significant at the .03 level (one-tailed). Thus, when using a subject's overall mean as a baseline, the OA score in the experimental group is significantly lower than that in the control group. This finding, however, could be a function of a general decrement on the Performance scales in the experimental subjects. Therefore, a mean deviation of the OA score from the Performance mean was computed for each group. A mean difference of 2.54 points was found between the experimental group and the control group yielding a t=2.09 (11 df) which is also significant at the .03 level. Using a similar procedure with the other subtests, no significant difference was obtained. These findings support the hypothesis that the OA subtest is significantly lower than other subtests in a group of subjects from whom bodily concerns appear to be a dominant preoccupation.

The second test of the hypothesis of the present study was based on a comparison of the Rorschach protocols of the

Age, Sex, WISC Scaled Scores, and IQs of Children With Bodily Concerns

And A Control Group

Age	Sex	I	C	A	S	V	DSp	PC	PA	BD	Cod	OA	VIQ	PIQ	FSIQ
High bodily concern group															
12-9	M	13	8	6	7	12	10	12	10	4	8	9	108	106	107
14-2	M	13	6	10	10	8	8	7	7	6	11	5	95	82	88
12-6	F	7	6	3	6	5	5	6	7	4	6	1	70	64	64
7-11	M	10	11	8	12	8	--	9	9	8	--	8	99	90	94
8-5	M	15	15	14	14	--	7	10	12	13	8	14	119	110	116
14-0	M	15	10	6	12	11	8	9	8	9	10	14	103	100	101
7-8	M	16	12	12	13	8	7	11	10	13	14	9	109	108	109
$\bar{X}$ 11.1		12.7	9.7	8.4	10.6	8.7	7.5	9.1	9.0	8.1	9.5	8.6	100.4	94.3	97.0
Control group															
13-7	M	13	10	5	9	10	8	10	9	8	8	13	95	97	96
8-4	M	11	6	6	12	10	7	14	7	13	10	14	91	107	99
12-10	F	13	7	6	9	9	7	11	4	10	8	9	90	89	88
12-9	M	12	10	9	12	8	10	9	8	5	4	11	100	82	91
9-6	M	15	17	13	18	--	15	9	11	10	12	13	135	107	124
15-1	F	18	17	13	20	16	11	16	20	14	13	19	137	145	144
$\bar{X}$ 12.0		13.7	11.2	8.7	13.3	10.6	9.7	11.5	9.8	10.0	9.2	13.2	108.0	104.5	107.0

Note -- Only four subjects were administered "Mazes," and therefore the test was not included. Hence the IQs in four cases may not be exactly equal to that presented here. Dashes indicate that a subtest was not administered.

adult patients with either conspicuously low or high OA scores. Rorschach protocols of these two groups were compared for the percentage of anatomical, sexual, blood, and X-ray responses and references to missing body parts; decay; disintegration; illness; death; and exaggerated, distorted, or grotesque body parts. Table 2 presents the mean age, IQ, OA score, and mean number of Rorschach responses reflecting bodily concern for the groups with low and high OA scores. Though the subjects with low OA scores are somewhat older and have a somewhat higher Full Scale IQ than the subjects with high OA scores, these differences do not approach statistical significance. The comparison of the percentage of Rorschach responses reflecting bodily concern in the Rorschach protocols indicates that there is a significantly greater percentage of these responses in the group with low OA scores ($\underline{p} < .025$). These results are most striking with males ($\underline{p} < .01$), but the comparison with females, though not statistically significant, also offers some support for the hypothesis.[3]

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[3] The means for the females subjects suggest that these scores do not differentiate between the female subjects with high OA scores and those with low OA scores, and in fact, they indicate a trend contrary to the hypothesis. It should be noted, however, that this difference in means is primarily a function of the extreme scores of 3 of the 10 subjects in the female group with high OA scores. If the two groups were scored merely on the presence or absence of responses indicating body concern, 70% of the female group with low OA scores and 30% of the female group with high OA scores have such responses. Even further, if the percentage of such Rorschach responses in the female groups are transformed by the arcsin of the square root of the percentages (Mosteller & Bush, 1954, p. 326), the group with low OA scores has a significantly greater percentage ($p < .03$) of Rorschach responses indicating bodily concerns. The authors are indebted to Neil Kornsweig for this latter observation.

Even when the comparison between the group with low OA scores and that with high OA scores is limited simply to a comparison of content categories, the percentage of anatomical, sexual, blood, X-ray responses, the two groups are significantly different ($p < .025$). Even further, there were significant differences between the group with high OA scores and that with low OA scores in three of the four content categories. The group with high OA scores had an average of .85, .10, and .65 responses in the anatomical, blood, and sexual categories, respectively, as compared with the group with low OA scores which had means of 1.95, .60, and 2.35 in these categories. The group with low OA scores had a significantly greater number ($p < .05$) and percentage ($p < .10$) of each of these three types of responses. There was no significant difference between the groups, however, in the X-ray responses. Each of the groups had only one such response.

The significantly greater amount of Rorschach responses reflecting bodily concern and preoccupation in subjects with conspicuously low OA scores is consistent with the findings in the first part of the study and clearly suggests that performance on the Wechsler OA subtest can be adversely affected by preoccupations and concerns about body intactness and integrity.

Mean Age, IQ, and Number of Rorschach Responses Indicating Bodily Concern for Subjects

With Conspicuously High and Low WAIS Object Assembly (OA) Scores

	Males		Females		Total	
	Low OA	High OA	Low OA	High OA	Low OA	High OA
Age	24.1	22.5	28.3	25.2	26.2	23.85
IQ	108.3	103.1	107.4	105.0	107.7	104.0
OA scaled score	6.6	13.5	6.8	13.4	6.7	13.45
Rorschach Number of responses	39.4	27.0	34.8	29.3	37.1	28.15
Total number of indications of bodily concern	16.6	3.8	5.2	5.2	10.9	4.5
Number of anatomical, sex, blood, and X-ray responses	7.8	0.8	2.1	2.5	4.95	1.65
Percentage of indications of bodily concern	37.12	11.01	15.61	18.33	26.36	14.67
p (one-tailed)	<.01				<.025	
Percentage anatomical, sex, blood, and X-ray responses	15.92	2.57	6.29	10.14	11.10	6.36
p (one-tailed)	<.01				<.025	

DISCUSSION

The results of the study clearly support the hypothesis that performance on the OA subtest of the Wechsler intelligence scales is susceptible to interference by concerns and preoccupations about body intactness. The OA subtest was found to be significantly lower in children with bodily concerns than in a control group. Furthermore, there were no other significant differences on any WISC subtests other than OA. Additional corroboration of the hypothesis of the present study was obtained in the comparison of bodily concerns as expressed on the Rorschachs of adult subjects who were selected because they had either conspicuously low or high OA scores. Subjects with low OA scores had a significantly greater percentage of Rorschach responses reflecting bodily concern than did a comparable group of subjects who had relatively high OA scores.

With regard to the results of this study, a question arises as to why the OA subtest is particularly susceptible to concerns about body intactness. In order to attempt an answer to this question, it is necessary to consider the nature of this subtest. For one thing, the subject is presented with an assortment of cut-up, seemingly random pieces of different size and design which must be actively built up into an unspecified whole.

Moreover, these seemingly dismembered pieces involve specific content--whole bodies or parts of bodies--which are likely to stimulate preconscious thought derivatives to a greater degree than more neutral stimuli. For these reasons, this test may bring into focus more sharply concerns about bodily integration.

A related question is the means through which OA efficiency is affected, whether concerns about the body act on visual organization directly or whether they tend to heighten one's anxiety in dealing with particular thematic material. Although no data in the present study bear specifically on this question, the fact that visual organization is not stimultaneously affected on other Performance subtests (especially on Block Design and Digit Symbol) suggests that the test stimuli probably have the effect of heightening underlying anxiety about bodily functioning. Visual organization, as such, has probably not been directly affected in any basic way.

Of particular interest, in addition, is the finding that the relationship between OA scores and Rorschach indexes of bodily concerns holds more for male subjects than for female subjects. No attempt was made to control the distribution by sex of the children in the first test of the hypothesis, but in retrospect it was realized that the experimental group was composed of six boys and only one girl and the control group of four boys and two girls. Furthermore, the incidental data of the study by Morrow and Mark (1955) which had suggested a relationship between OA scores and bodily concerns was based entirely on male subjects. Why the finding is predominantly evident for males is not altogether clear. It may indicate that a concern over body intactness is a more prevalent issue for males, perhaps a consequence of the greater role of castration anxiety in the mental life of males. Such a hypothesis is suggested by Fenichel who notes that "analysis shows that other and older fears, above all the fear over loss of love, are stronger in women and in many ways take over the role that castration anxiety plays in men [1945, p. 99]." It is also possible that OA may be inappropriate as a means of tapping bodily concerns in women and that another measure would be more revealing. A further consideration is that concerns about body intactness in men may be related primarily to questions about being functionally intact, physically efficient, and capable of making and doing. With women, however, bodily concerns may center more around physical attractiveness and beauty with the possible exception around the issue of conception, pregnancy, and nursing.

The results of the present study, however, offer confirmation of the basic hypothesis that functioning in the seemingly neutral Wechsler OA subtest can be disrupted by concerns about body integration. In addition to confirmation of this primary hypothesis, the results of this study are also somewhat relevant to the research on body image. Some attempts have been made to study the relationships between body image and intellective processes, but the results have been inconclusive. Fisher and Cleveland (1958), for example, conclude that "one may say with a fair degree of assurance that the body image scores are not appreciably influenced by intelligence" and "boundary scores are not consistently related to such variables as intelligence. . . . [Fisher, 1963]." In the latter article, however, Fisher (1963) cites an unpublished study by Fitzgerald (1961) in which children with Legg-Calvè-Perthes Disease (a disorder of the hip) were found to have higher boundary scores than normals and also relatively greater skills in the Performance than Verbal WISC tests. More recently, Fisher (1964) reports that the degree of body awareness can influence memory for body relevant words. Witkin (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962) reports that an articulated body concept, as measured in figure drawings, is significantly correlated with an analytic field approach and with a WISC

Intellectual Index, composed of the Picture Completion, Block Design, and Object Assembly subtests, all of which "require analytic competence." A Verbal Index, composed of the Vocabulary, Information, and Comprehension subtests, however, did not correlate significantly with the degree of articulation of body concept. The results of the present study suggest that Witkin's findings are in part a function of the relationship between body concept and the OA subtest.[4] With regard to the research on body boundaries (Fisher & Cleveland, 1958) it is unclear how concerns about body intactness would be expressed in boundary scores. Subjects with high-barrier scores "experience their body boundaries as definite and firm," and penetration scores express body boundaries experienced as "indefinite and vague" (Fisher & Cleveland, 1958). It seems likely that bodily concerns could be expressed in penetration responses, but frequent barrier responses could also indicate bodily concerns. Subsequent research might investigate the relationships between body boundary scores and Wechsler subtests, particularly the Object Assembly.

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[4] Witkin, in a personal communication, indicated that the articulation of body concept on the figure drawings correlates significantly only with Block Design and Object Assembly.

The convergence between the WAIS OA test and the Rorschach responses demonstrates the value of a psychoanalytic ego psychological point of view which stresses the relationships between functioning in structured and neutral situations and functioning in less structured, more novel situations where there is no premium on right and wrong answers or on highly logical and rational processes. A full psychological assessment depends on a study of functions on these various levels, and, furthermore, it is a convergence in behavior in these different situations which reflects the general cognitive consistencies (or cognitive styles) of an individual. Functioning on the WAIS bears the intimate stamp of personality, a fact amply suggested in the research on cognitive styles (Gardner, Holzman, Klein, Linton, & Spence, 1959).

The consistency of behavior in situations varying in structure and novelty touches as well on an issue which is fundamental to every clinical endeavor, namely, the issue of what constitutes sufficient evidence for interpretation. We proceed on the assumption that one major means through which an interpretation can be evaluated isin terms of the number of lines of inference which converge toward a particular interpretation. In large measure, the strength of interpretations depends on the degree to which varied data seem to force themselves inevitably toward a similar conclusion, and the reliance on such convergent indicators tends to lend an internal cross-validation to clinical work (Engel & Blatt, 1963; Erikson, 1958; Holt, 1961; Schafer, 1954). Thus, in test interpretation, various aspects such as the content and structure of the response process, styles of verbalization, mood, sequence of response, the interpersonal transaction, the life circumstances of the patient -- his age, sociocultural level -- all need to be considered.

Beyond the fact of demonstrating a particular convergence between two test indicators, the results of the present study are important for an additional reason. Inasmuch as scatter analysis of the WAIS is in general disrepute -- largely we feel because of the relatively mechanistic use of it in research studies -- our observations suggest that relationships between subtests can conceivably yield meaningful hypotheses about significant dimensions of personality. The use of the WAIS as a measure of personality is relatively sketchy and unexplored; some guide posts for its exploration are present, but its full understanding will eventually enrich and be enriched in turn by a conception of cognitive and adaptive processes.

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CHAPTER IX

The Information and Comprehension Subtests

Study A:

Sexual Identity and Cognitive Functioning on the WAIS[1]

Given an inter-relatedness of personality and cognitive-perceptual functioning, one of the personality dimensions which might have differential effect on some aspects of intellectual performance is the individual's sexual identity. Wechsler (1958, p. 144-151) has proposed a masculinity-femininity (M-F) index, composed of the score on three "male" subtests minus the score on three "female" subtests. "Male" (Information, Arithmetic, and Picture Completion) and "Female" (Vocabulary, Similarities, and Digit Symbol) subtests were chosen on the basis of the scores achieved by each sex in the standardization sample. This post-hoc analysis of the standardization data was an atheoretical attempt to obtain an index which would maximize the differentiation of sex differences in cognitive functioning. A study by Levinson

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[1] This study was conducted by Joseph LoPiccalo and Sidney J. Blatt.

(1963), however, failed to confirm significant sex differences on the M-F index, while other investigators have found only weak correlations between Wechsler M-F scores and MMPI M-F scores (Krippner, 1964). Coslett (1965) found that Wechsler's M-F score was not significantly affected in paranoid schizophrenia, even though paranoia has been shown to be related to sexual identity confusion (Zamansky, 1958; Wolowitz, 1965). A recent review of the literature has concluded that "The utility of the M-F index remains in doubt " (Guertin et al., 1966). The present study is a more theoretically based attempt to study the relationship between sexual identity and aspects of intellectual functioning on the WAIS.

It has been recognized clinically that in our society obsessive personality features tend to occur primarily in males while hysterical features are seen most frequently in females. "There is no doubt that hysteria has a strong affinity with femininity, just as obsessional neurosis does with masculinity" (Freud, 1925, p. 143). This would suggest that males with hysterical features, and females with obsessive features have personality organizations which are in part more typical of the opposite sex. Clinical observations have been consistent with this formulation, e.g., "an unconscious tendency to (sexual)

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inversion is never absent in, and is of particular value in throwing light upon hysteria in men" (Freud, 1905, p. 57).

The WAIS subtest scatter patterns associated with hysterical and obsessive personality features are primarily expressed in the balance between the Information and the Comprehension subtest scores (Schafer, 1948). The Information subtest taps intellectual strivings and memory (Mayman et al., 1951; Rapaport, et al., 1945) and is usually inhibited by the extensive use of repression (blocking of memories from consciousness) which is one of the defining qualities of hysterical character organization (Schafer, 1948; Freud, 1925, p. 164). On the other hand, attention to detail and intellectual strivings characteristic of obsessive organization often lead to an elevated Information score (Schafer, 1948). The Comprehension subtest, on the other hand, is considered to assess social conventionality and social judgment (Rapaport et al., 1945). It is frequently elevated by the hyperconventionality, naivete, and compliance with perceived social demands typical in hysterical features (Schafer, 1948). The obsessive's excessive qualification and uncertainty in making judgments, as well as his rigidity and lack of concern with social conventions, frequently is expressed in a decrement on the Comprehension subtest (Schafer, 1948). In summary, "High

Comprehension, especially coupled with lower Information, therefore, is characteristic for hysterics. The reverse pattern, high Information and lower Comprehension, is generally seen in the obsessive" (Blatt and Allison, 1967).

It was hypothesized, therefore, that there would be a relationship between the balance of WAIS Comprehension and Information subtests and independent measures of sexual identity conflict. Clinical observations of patients lent some validity to these formulations and the present study was an attempt to empirically investigate the relationship between measures of sexual identity formation and the Information-Comprehension balance on the WAIS.

METHOD

Selection of Subjects

The Information (I) and Comprehension (C) subtests of the WAIS were given to 206 sophomores in a psychology class at a local state college. Six Ss (4 males, 2 females) either failed to supply identifying data or answered only a few items, and hence their protocols were not scored. The remaining protocols (150 from females, 50 from males), were scored blind with respect to the sex and an Information-Comprehension balance score was computed for each S. This score consisted of the Information scaled score minus the Comprehension scaled score.

Selected for comparison on the experimental measures were two groups of male Ss and two groups of female Ss. One of the groups of males consisted of all males who obtained a negative (C > I) score (n = 9). Sixteen male Ss obtained scores of I > C by four or more points and nine of these sixteen males were randomly chosen to form the other group of male Ss. Similarly, the nine highest positive (I > C) scoring females formed one of the female groups, while the nine females who obtained the highest negative scores formed the other female group.

Approximately three weeks after the group testing, these Ss were contacted by telephone and offered $3.00 to participate in a one hour study of verbal learning and memory. Ss were told that their names had been randomly selected from the enrollment list of their psychology class and were strongly urged to participate because "otherwise our random selection procedure will be disrupted." There was nothing said to indicate that this study was connected with the WAIS forms the subjects had filled out in class. The prior procedure conducted in class had been represented as a complete experiment in itself and was run by a different experimenter.'

All eighteen females originally selected on the basis of their I-C scores agreed to participate. One male in the C>I group could not be contacted, which reduced the size of this group to eight _Ss_. In order to obtain seven male _Ss_ in the I>C group, sixteen subjects had to be contacted. Six of these males refused to participate, and three others failed to follow experimental procedures. It was only in the male I>C group that difficulty was experienced in getting _Ss_ to participate.

All subjects were seen individually by a same sex experimenter. All males were run by a male experimenter, and all females by a female experimenter. Both experimenters were uninformed as to the I-C group to which _Ss_ belonged.

Experimental measures

The experiment was presented as a study of the effect of interposed irrelevant activity on learning and memory. These irrelevant activities actually yielded the data on the _Ss_ sexual identity formation. The first of the two irrelevant tasks consisted of the procedure developed by Zamansky (1956) to assess sexual identity. This procedure involves having the subject view sequentially 25 pairs of pictures presented in an apparatus which permits the experimenter to record, unknown to the _S_, the number and duration of eye fixations at each member of a given pair of pictures. This recording was done with two pushbutton controlled pens of a constant speed pen recorder. In this apparatus, the subject's head is immobilized and the pictures are presented at the extremes of his field of vision, making eye fixation position unmistakable. Each pair of pictures was presented to the subject for twenty seconds, with a forty second rest period between pairs. These 25 pairs of pictures were of five types:

1. Pairs of pictures of neutral (non-human) objects (n = 6 pairs).

2. A picture of a normally dressed man paired with a picture of a normally dressed woman, both engaged in everyday activity (n = 10 pairs).

3. A picture of a normally dressed man paired with a picture of a neutral object (n = 3 pairs).

4. A picture of a woman paired with a picture of a neutral object (n = 3 pairs).

5. A picture of an attractive, partially nude man paired with a picture of an attractive, partially nude female (n = 3 pairs). These three pairs were judged to be sexually arousing.

These five types of picture pairs were presented in a fixed random order to all subjects. The position of each type of picture in a pair was counter-balanced as far as possible, so that, for example, half of the male-female pairs featured the male on the left and the female on the right, and vice versa. Some of these picture pairs were the original ones used by Zamansky (1956), while others were newly selected from approximately 150 magazine photos. Graduate students in clinical psychology had previously rated the pictures, so that the final pairings were of photos judged to be of approximately equal interest.

In accordance with the data obtained from a group of male homosexuals and a group of normal males on these same five types of paired pictures (Zamansky, 1956), the following predictions were made for male Ss:

1. On the male-female picture pairs, it was expected that the C > I (as compared to the I > C) group would manifest greater attraction to the pictures of males than to the pictures of females.

2. On the male-neutral picture pairs, men in the C > I group (as compared to the I > C group) would show a greater preference for pictures of males over neutral objects.

3. On female-neutral pairs, men in the I > C group (as compared to the C > I group) would look more at females than at

neutral objects.

4. When faced with a choice between pictures of sexually arousing men and women, men in the I > C group (as compared to the C > I group) would express a greater preference for the pictures of the women.

While Zamansky (1956, 1958) found no between-group differences in eye fixation times on the neutral-neutral pairs, he did find a consistent preference for the picture presented in the right hand position in the apparatus. This occured despite changing the right-left position of the pictures in these pairs. This suggests a bias to fixate on the right hand picture of a pair, independent of the content of the pictures, perhaps caused by the usual dominance of the right eye associated with right handedness. To get an estimate of the content-free position bias of each S which could be used to correct the fixation times on the other four types of pairs, the six neutral-neutral pairs used in this study were pairs of identical pictures. Correction for fixation bias was done by subtracting each S's average bias on the neutral-neutral pairs from his scores on the other types of slide pairs. The eye movement recordings were scored blind with respect to sex and group. Scoring was done by measuring the pen recordings and converting these scores to time units.

One of the assumptions of the Zamansky procedure is that the S is unaware of the fact that his eye movements are being observed and is therefore behaving naturally. Ss were questioned at the end of the experimental session and the data from three males who were aware of being observed was not scored but discarded.

The second irrelevant interposed activity was the administration of six Thematic Apperception Test cards (numbers 4, 6BM, 7BM, 10, 13MF, and 18BM). The protocols from these cards were scored blind on a scale composed of eleven indicators found empirically to differentiate male overt homosexuals from normal males (Davidson, Joelson, and McArthur, 1956; Lindzey, Tejessy, and Zamansky, 1958; Lindzey, 1965). The mean number of indicators present in the protocols comprised the second measure of sexual identity formation, with a higher mean score being predicted for the members of the male C > I group than the male I > C group.

Neither the Zamansky eye fixation technique nor the Thematic Apperception Test homosexuality scale have previously been used to assess female sexual identity formation. Since there is no validation data for females on these two procedures, the comparisons of the two female groups in the present study were considered exploratory.

Procedure

Upon entering the experimental room, Ss were told that this was a study of verbal learning and memory, investigating the effect of interposed irrelevant activity on learning and memory. Ss were told that they would be asked to learn a list of paired nonsense words, given two distracting tasks to do, and then tested for recall of the paired words. Ss were then given the word list to study for one minute. Ss were then seated at the Zamansky apparatus and told that they would be shown some pairs of pictures in the apparatus and that they should look at them carefully. Ss were told to sit back and relax in the forty second rest interval between slides. After completing the Zamansky procedure, Ss were given the standard administration of the six TAT cards. Finally, in accordance with the rationale of the study, Ss were then tested for recall of the five pairs of nonsense words. At this time, subjects were questioned concerning what they thought the E had been doing while they looked at the slides, to eliminate those Ss who were aware of being observed. All instructions were given from a standard script which the experimenters had memorized.

Ss were not debriefed in the usual sense of the term since half of the Ss had been selected because it was hypothesized that they would exhibit some conflicts in sexual identity. Ss were merely told, at the completion of the experimental session, that their eye movements had indeed been recorded as a measure of how shifting attention disrupted memory. The TAT cards were explained as a device for testing the effect of creative activity (story telling) on memory. All Ss seemed satisfied with these explanations and none voiced suspicion. Finally, Ss were asked not to discuss the study with others until it was completed so that other Ss would be uninformed about the hypotheses concerning memory disruption.

RESULTS

WAIS Information-Comprehension (I-C) Balance Scores:

The distribution of the I-C balance scores for the entire sample is presented in Table 1. Inspection of the distributions reveals that, as predicted, males tend to typically obtain

TABLE 1

Distribution of I-C Balance Scores

Sex of Subject	Number of subjects with each pattern			
	I > C	I = C	I < C	Total
Male	34	7	9	50
Female	87	20	43	150
				200

a pattern in which $I > C$ (median = +2.1). It is also clear that the women in this sample do not, however, typically obtain the predicted pattern of $C > I$, but also tend to obtain an $I > C$ pattern (median = +1.0). The distribution of I-C scores as shown in Table 1 does not differ between men and women (chi^2= 2.27, p = >.30). If the size, however, as well as the direction, of the I-C differences is considered, it appears that men achieved a significantly higher mean I-C score than did women ($\bar{x}$ = +1.80 for men, +0.95 for women, z = 1.88, p = .03, 1 tail). This suggests that although the women as well as the men in the present sample tended to have Information higher than Comprehension, the difference between these two subtests was significantly greater in men than in women.

As previously indicated, two groups of men and the two groups of women were selected on the basis of having extreme scores on the opposite ends of the distributions of I-C scores. Table 2 presents the means and ranges of I-C scores for the four experimental groups.

TABLE 2

Means (and Ranges) of I-C scores for Selected Subjects

	Group	
Sex of subject	$I > C$	$C > I$
Male	+4.86 (N = 7)	-2.86 (N = 8)
	(+4 to +8)	(-1 to -5)
Female	+5.67 (N = 9)	-3.89 (N = 9)
	(+5 to +8)	(-3 to -5)

As indicated earlier, there was particular difficulty in obtaining subjects for one of the experimental groups. While all eight of the C > I males contacted agreed to participate, six of the sixteen I > C males contacted refused to participate. This difference between the two groups of males in their willingness to participate was significant ($chi^2 = 4.02$, $p = < .05$).

Eye Fixation Data:

These data were originally analyzed as a 2 x 2 analysis of variance (sex by I-C balance) with five dependent variables. The comparisons of interest in the present study, however, are the differences in eye fixation predicted between the I > C and C > I groups within each sex. These two cell comparisons were analysed using a technique for testing *a priori* hypotheses within an analysis of variance design (Winer, 1962, p. 207-211). The initial 2 x 2 analyses, not reported here, were performed only because this unweighted means solution uses as an error term the mean square for error from the 2 x 2 analysis of variance.[2] The mean fixation time preference scores, corrected for bias as explained above, and significance levels of differences between these scores for the I > C and C > I groups within each

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[2] The interaction term from the 2 x 2 analysis of variance is also a relevant, but less sensitive and precise, way of evaluating these data. None of these five interaction terms were found to be significant.

TABLE 3

Eye Fixation Data - Corrected for Bias

		Mean Fixation Time-Seconds			
		Group		F	Direction of difference
	sex	I > C	C > I		
ime on left neutral inus time on right utral[a]	female	-2.59	-1.10	33.38**	no prediction made
	male	-2.58	-2.62	<1.0	-------------
me on male picture minus me on female picture	female	-0.87	-0.85	<1.0	-------------
	male	-3.27	-3.12	<1.0	-------------
me on male picture nus time on neutral cture	female	+0.19	+0.55	<1.0	-------------
	male	+2.42	-1.76	86.50**	opposite to prediction
me on female picture nus time on neutral cture	female	-2.41	-2.82	<1.0	-------------
	male	-1.94	+0.27	12.10**	opposite to prediction
me on arousing male cture minus time on ousing female picture	female	+3.03	-1.99	5.76*	no prediciton made
	male	-1.88	-2.55	6.69*	opposite to prediction

* $p < .05$

** $p < .01$

[a] Data uncorrected for bias. When corrected, values in these 4 cells = 0.

sex are shown in Table 3. For the two groups of male subjects, significant differences in fixation times occur on three (male with neutral, female with neutral, and arousing male with arousing female) of the four types of sexually relevant picture pairs. In all three of these cases, however, the direction of the difference was contrary to expectation.[3]

The data for the female I > C and C > I groups, also presented in Table 3, is less consistent. The only significant difference in bias-corrected fixation preference occurs on the arousing male with arousing female picture pairs, and is in the direction opposite to that predicted. Analysis of the data uncorrected for fixation bias yielded a significant difference in fixation preference only on the male-neutral pairs ($F = 24.16$, $p = < .01$). However, this difference is probably an artifact of differences in fixation bias, as a significant ($F = 33.38$, $p = < .01$) but apparently chance difference between the female I>C and C>I groups occurred on the identical neutral-neutral pairs. It may be noted in Table 3 that all four groups exhibited the expected right hand position bias on the pairs of identical neutral-neutral pictures.

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[3] The direction and significance levels of these differences were unchanged in an analysis of the data uncorrected for fixation bias.

Thematic Apperception Test Data:

The mean scores for the male and female I > C and C > I groups on the TAT homosexuality scale are shown in Table 4. For males, the difference between group means approaches significance, with the C > I group obtaining, as predicted, a higher mean score (t = 1.62, p = .06). The mean scores on the TAT homosexuality scale for the I > C and C > I females indicate no significant difference (t = 0.13).

TABLE 4

Mean Scores on TAT Homosexuality Scale

	Group		T	p
	I > C	C > I		
Males	3.14	4.63	1.62	.06
Females	3.33	3.22	0.13	ns

DISCUSSION

In an attempt to test the assumption that the balance between the WAIS Information and Comprehension subtests may, in part, reflect conflicts in sexual identification, a group of undergraduates were given both the WAIS Information and Comprehension subtests. As would be expected in a college sample because of their intellectual strivings, there was a general tendency for Ss to achieve higher scaled scores on Information than on Comprehension. Also, as expected, there was a significantly greater difference between Information and Comprehension scaled scores in males than in females.

The findings also suggest that a pattern in males in which Comprehension exceeds Information (as compared to the reverse pattern) tends to be associated with higher scores on a TAT homosexuality scale ($p = .06$). Eye fixations on the Zamansky procedure also consistently differentiated the two male groups ($C > I$ and $I > C$). These significant differences, however, were consistently in the direction contrary to expectation. These expectations were based on the assumption that $C > I$ males would behave similarly to the homosexual Ss in Zamansky's (1956) study. Zamansky's Ss, however, were overt homosexuals; their homosexuality was conscious and accepted by them. Furthermore, Zamansky's Ss agreed to participate with the knowledge that their homosexuality was the basis for having been selected for the study and they may have felt little pressure to behave in a socially appropriate manner (i.e., to show interest in pictures of women). In the present study, most of the $C > I$ subjects were probably not overt homosexuals, and certainly they had no suspicion that the experimenter's hypothesis concerned their sexual identity formation. It seems possible the eye fixations of these C > I *S*s may have been influenced by defensiveness and by attempts to supress homosexual tendencies and avoid the pictures of males. Since, it was possible that defensiveness about sexuality in the C > I group might have led to consistent and significant reversal in the data, the TAT protocols of the male I > C and C > I groups were independently scored on a scale measuring the occurance of manifest sexual content (Clark and Sensibar, 1955). Lower scores on this scale have been demonstrated to indicate defensiveness about expressing sexuality (Clark and Sensibar, 1955; Mussen and Scodel, 1955). As indicated in Table 5, the C > I group tended

TABLE 5

Mean Scores on TAT Sexual Defensiveness Scale

	Group		t	p
	I > C	C > I		
Males	4.86	3.00	1.69	<.06
Females	4.44	3.78	0.57	ns

to be more defensive about expressing sexuality ($p < .06$, 1 tail). The reversal in the results with the eye fixation measures may be a function of defensiveness about sexual matters on the part of the C > I group. It should be noted that the correlation between the TAT homosexuality and defensiveness scales was non-significant ($r = +.20$). Greater defensiveness of the C > I Ss does not seem to be an artifact of higher scores on the homosexuality scale. In summary, there seem to be significant relationships between Comprehension - Information balance in males and measures of sexual identity conflicts.

These relationships, however, were not found in the female sample. The derivation of this relationship depended in part upon the assumption that women typically show a C > I balance pattern, which did not prove to be true for the current sample. It is possible that this may be a function of the fact that the intellectual strivings of college women may be expressed in elevated scores on the Information subtest (Rapaport, et al., 1945). It should also be recalled that TAT homosexual scale (Lindzey, 1965) and the Zamansky (1956) procedure were developed for and validated only upon male subjects.

A serendipitious finding of this study was the significantly greater tendency ($p = < .05$) of male I > C subjects to refuse to participate despite being told that their refusal would seriously disrupt the research project. While unexpected, this result is consistent with theoretical conceptualization about the autonomy and obstinacy characteristic of the obsessive personality. It is not clear, however, why this greater tendency to refuse to participate in the experiment did not also occur in the female I> C group.

As a methodological point, it should be noted that in this study, as in the prior two studies which used the eye fixation technique (Zamansky, 1956, 1958), there was a consistent fixation preference bias for pictures presented on the right in the apparatus. This preference occurred even though the neutral-neutral pairs used in this study were identical pictures. This suggests that a correction for this content-free bias tendency is necessary when using this technique.

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CHAPTER X

The Wechsler Digit Span and Digit Symbol Subtests

STUDY A:

Energy Deployment and Achievement[1]

The economic model of psychoanalysis is a pivotal yet highly controversial aspect of psychoanalytic theory (Rapaport & Gill, 1959). Despite the centrality of the concept of energy in psychoanalytic theory, however, this concept seems to have been relatively ignored in experimental studies of human behavior. Part of the reluctance to invoke a construct such as energy may be its high degree of nonvisibility (Heisenberg, 1958). Yet energy in psychological phenomena can be defined, much as it is defined in physics, as the capacity to do work.

As Rapaport and Gill (1959) point out, the assumption of a law of conservation of psychological energies is an essential aspect of the economic point of view. Such an assumption need not postulate the psychic apparatus as a closed system. It is sufficient that at any given moment the energy available be regarded as a fixed quantity. Whether, for example, the total available energy is less in states of fatigue is irrelevant to the point of view presented in this paper. The assumption is merely that the individual is continually utilizing his finite capacities in a variety of tasks and that the deployment of energy into one activity decreases the amount which can be utilized in others. Such a viewpoint is consistent with the findings of Toman (1954) and Lustman (1957).[2]

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[1] This study was conducted by Paul Wachtel and Sidney J. Blatt and was published in the Journal of Consulting Psychology, 1965, 29, 302-308.

Wishner (1955) utilized an energy construct in his proposal that a continuum of mental health may be conceptualized in terms of the individual's degree of efficiency in meeting the requirements of the environment. He suggested that there are two ways in which energy may be expended: (a) in focused behavior, energy is expended directly on a required task; (b) in diffuse behavior, energy is expended in directions irrelevant to the task. Efficiency may be regarded, at least in part, as a direct function of the ratio of focused to diffuse behavior. Any task will have implicit, and to each subject somewhat idiosyncratic, demands in addition to those explicitly expressed by the experimenter. In addition to the explicit "experimental task," a subject might be concerned with reducing his anxiety, impressing the examiner, figuring out what the experiment is about, pleasing the experimeter, etc. (Orne, 1962), and these issues are, of course, not mutually exclusive. Nevertheless, the healthy, reality-oriented subject should meet the demands of the environment which he has consciously accepted and those which result in adaptive gain.

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[2] It should be noted that the energies referred to in the study correspond rather closely to what would be called "ego energies," although they are not the only manifestations of such energies (for example, defenses also use ego energy for their operation). Libido, on the other hand, refers to "apparent intensities of feelings and impulses" (Kubie, 1947). The relationship between these two energy concepts, as well as the source of ego energies, is an important area for future investigation.

Energy Deployment in Academic Achievement

The basic hypothesis of the present study is that the capacity for directed, focused, and efficient expenditure of energy is an essential part of achievement both in academic and extracurricular activity. If this hypothesis is correct, then it should be possible, in a sample homogeneous with respect to intelligence, to discriminate between high and low achievers on the basis of the capacity to channel energy in an appropriate and goal-directed manner. Thus, if a task were devised in which success was primarily dependent on effective deployment of energy, marked differences in performance should be evident between a group of high academic and extracurricular achievers and a group of individuals of equal intelligence whose record showed no particular success in academic or extracurricular life.

The Digit Symbol (D Sy) subtest of the Wechsler Adult Intelligence Scale (WAIS) appeared to be an appropriate task through which this general hypothesis might be tested. The D Sy has been conceptualized as a test of psychomotor speed, concentration, and learning (Rapaport, Gill, & Schafer, 1945). The amount of learning, however, appears to be largely a function of the adequacy of concentration (Mayman, Schafer, & Rapaport, 1951), and several investigators have failed to find a relation between D Sy performance and learning (Burik, 1950; Luchins & Luchins, 1953). Performance on this task, then, seems primarily to be a function of speed and concentration; subjects who produce more symbols in a given time are those who are able to direct their energies to the accomplishment of the required task. Thus, subjects who differ on D Sy but are homogeneous with respect to more stable and valid predictors of intelligence may be regarded as differing in capacity to direct their energies.

The D Sy is also suited to aid in answering another question about group differences in energy output: If there are differences in D Sy productions, are they a result of differences in the level of energy or a difference in the deployment of energy? By placing a set of manifold carbon papers under the D Sy sheet, it is possible to measure the pressure which a subject exerts while writing the required symbols. Greater than average pressure would represent an inefficient deployment of energy. It was expected that low achievers would,not only finish fewer symbols but would also press harder on the carbons. Such performance would suggest that their poor functioning may be due to an inability to direct their energies as well as to an inferior total output. High achievers were expected to inhibit purposeless discharge and restrict their energies into goal-adaptive behavior, whereas low achievers were expected to demonstrate greater free discharge in the form of relatively unrefined and poorly directed effort.

Attempts at Disruption--Failure Reports and Self Concept

In addition to investigating the relationship of patterns of energy deployment to high general achievement, an attempt was made to introduce a possibly disturbing variable (a report of failure) and note the degree to which the patterns of energy deployment would be altered. Lazarus and Erikson (1952) found that high achievers improved and low achievers did more poorly on a second administration of D Sy after a failure communication. Thus, it was expected that high achievers in the present study would have greater improvement on D Sy following a report of failure than low achievers.

The effect of a failure report, however, may also vary depending on whether it confirmed or contradicted the subject's expectations. As Miller and Worchel (1956) point out, "severity of anxiety or subjective stress depends upon the S's evaluation of the performance in terms of his level of expectancy in the situation." This level of expectancy would seem to depend on both the subject's real achievements in previous testing situations and his self-image. Thus, subjects were so chosen that for both the high- and low-achievement groups, half the subjects evidenced high self-regard and half evidenced low self-regard. The effects of self-regard, however, cannot be clearly predicted. Child and Waterhouse (1953) note that frustration in a particular activity may result in a response which is lower on the hierarchy for that situation and which is generally less adaptive. They also suggest, however, that an individual can respond to frustration with responses which increase motivation and thus increase the quality of the performance. The extent to which self-regard will be a factor in such increased motivation is not clear. An equally convincing rationale could be devised for several different predictions about self-regard. For example, one might expect that reports of failure to high-achieving, low-self-regard subjects will have a strong mobilizing effect, enabling them to surpass their high-self-regard counterparts, or one might expect that such reports will be more stressful to the low-self-regard subjects, bringing about disorganization and inefficiency. Similar alternatives were apparent for the other three experimental groups. No specific predictions were therefore made concerning main effect for self-regard or interaction between self-regard and achievement. This aspect of the study was regarded as exploratory.

Effect of Anxiety

In addition to self-regard, anxiety was also considered to be a possibly relevant aspect of personality influencing the deployment of energy under stress. There has been evidence (Mandler & Sarason, 1952; Taylor, 1958) that anxiety may be a facilitating factor under neutral conditions but a debilitating one under stress. In the light of Taylor's explanation in terms of higher drive level and the above hypothesis relating to energy output and its efficient utilization, it became of interest to investigate differences in performance between Part I and Part II as a function of measured anxiety.

Hypotheses:

1. High achievers will perform better on the D Sy than low achievers.
2. High achievers will exert less writing pressure while performing the D Sy task than low achievers.
3. High achievers will improve more the second time than will low achievers.
4. High-anxious subjects will improve less the second time than low-anxious subjects.

METHOD

A self-description test (Blatt, 1964; Stein, 1964) was given to 188 members of an introductory psychology class at Yale University. Subjects were asked to rank 20 descriptive paragraphs derived from Murray's list of basic manifest needs in the order most descriptive of themselves. Subjects were told that the questionnaires were just one of the pedagogical devices used in the class. The experimenter chose as subjects those students who were in the top and bottom thirds of the distribution of discrepancies between described self and an ideal previously defined by seven advanced graduate students (Blatt, 1964)[3] and who had a college record which indicated either high or low achievement. High achievement was defined as having grades consistently in the top third of the class and an extracurricular record which showed no serious poverty of social activity. Low achievement was defined as being in the bottom third of the class and with an extracurricular record which showed no evidence of achievement in athletics, fraternities, publications, etc. Both academic achievement and extracurricular activities were considered in order to avoid selecting students who received low grades because they chose to devote their energy to tasks other than their studies such as social or athletic activities. Thus, subjects in the low-achievement groups had low grades and seemed equally thwarted in extraacademic endeavors. Out of the original pool of 188 students, 38 satisfied the conditions for one of the experiemental groups--10 each in the high achievement--high self-regard, high achievement--low self-regard, and low achievement--high self-regard groups and 8 in the low achievement--low self-regard group. The subjects were contacted and told that they had been chosen "by a process of random selection" to participate in a study concerning the relationship between personality factors and intelligence. After a 10-minute interview, the prime purpose of which was to encourage rapport, the Freeman (1953) Manifest Anxiety scale was administered. The subject then received a revised form of the D Sy subtest, expanded to 3 minutes, with emphasis put upon the fact that this was a subtest of an intelligence test. Upon completion of the task, the experimenter acted quite surprised by the results, asked the subject if something had been disturbing him during the test, flipped through the pages of the WAIS manual pretending to be finding the percentile ranking of the subject's score, and finally told the subject that he could not understand such poor performance and would have to administer the test again.

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[3] Dymond (1954) reports a significant correlation (*r*=.83) between self-ideal discrepancies and differences between self-description and judges' ideal. Thus, the measure of discrepancy between self-description and judges' criterion in this study can be viewed as a measure of self-regard.

A set of manifold carbon papers was attached beneath the D Sy face sheet. It was thus possible to measure the degree of pressure exerted by the subject by counting the number of sheets upon which carbon copy markings from the subject's writing were visible. Judgments of visibility were made by an independent judge both from an ascending and descending order, and the results were averaged.[4] Postexperiment interviews revealed that none of the subjects was aware of the carbons underneath the test sheet.

In a test session subsequent to the experimental session, more explicit evidence of the homogeneity of the subjects with respect to measured intelligence was obtained. Thirty of the original 38 subjects participated in this subsequent session and were administered the Information and Vocabulary subtests of the WAIS.[5]

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[4] These scores correlated .86 with judgments made by a second judge.

[5] Since this session was conducted in the subsequent semester, several of the subjects had left school. In addition, several other subjects declined to participate since participation was on a strictly voluntary basis with no financial remuneration. The number of subjects not participating in this session, by groups, was as follows: high achievement--high self-regard, 1; low achievement--high self-regard, 2; low achievement--low self-regard, 2; and high achievement--low self-regard, 3. A recomputation of the data based only on the 30 subjects who participated in the subsequent session produced no essential change in the results.

TABLE 1

Mean Digit Symbol Score and Mean Number of Sheets On Which Writing Was Visible On Part I

Group	D Sy score	Sheets
High achievement-high self	137.2	7.75
High achievement-low self	133.1	6.15
Low achievement-high self	118.4	8.45
Low achievement-low self	117.6	8.00

Analysis of variance[a]

Source	df	MS	F
D Sy			
Achievement (A)	1	293.69	12.72**
Self-regard (SR)	1	5.94	0.26
A X SR	1	2.77	0.12
Within groups	34	23.19	
Total	37		
Sheets			
A	1	1.625	4.21*
SR	1	1.050	2.72
A X SR	1	.331	.86
Within groups	34	.386	
Total	37		

[a] Due to nonproportionate *Ns* for the four experimental groups, all analyses of variance were performed utilizing means for each group rather than totals and treating as one entry per cell with adjusted within-groups sum of squares as error term (Anderson & Bancroft, 1952).

* $p < .05$.

** $p < .005$.

TABLE 2

Mean Digit Symbol Score and Mean Number of Sheets On Which Writing Was Visible On Part II

Group	D Sy score	Sheets
High achievement-high self	154.4	7.45
High achievement-low self	147.0	6.45
Low achievement-high self	134.0	8.50
Low achievement-low self	127.0	8.06

Analysis of variance

Source	df	MS	F
D Sy			
Achievement (A)	1	408.04	10.92**
Self-regard (SR)	1	51.84	1.39
A X SR	1	.04	.001
Within groups	34	37.55	
Total	37		
Sheets			
A	1	1.769	3.85*
SR	1	.518	1.13
A X SR	1	.079	0.17
Within groups	34	.46	
Total	37		

* $p < .05$.
** $p < .005$.

RESULTS

Table 1 shows group means on D Sy and mean number of sheets on which writing was visible for all experimental groups on Part I. A two-way analysis of variance indicated significant differences between high and low achievers on the D Sy score and in number of sheets.

Table 2 presents a similar analysis for Part II. The difference between high and low achievers is again significant for the D Sy score and for the pressure of writing as measured in the number of carbon sheets.

Intergroup differences in D Sy improvement (score in Part II minus score in Part I) did not approach significance. Though the two high-self-regard groups had the two highest improvement scores, within-group variance was large, and this suggestive trend did not approach significance. It should be noted that in postexperimental interviews more than half the subjects reported some suspicion of failure manipulation. By group, the number of subjects reporting suspicion was high achievement-high self-regard, 9; high achievement-low self-regard, 5; low achievement-high self-regard, 3; and low achievement-low self-regard, 4. The nonsignificant between-group differences in mean improvement may be in part attributable to such suspicions. It should also be noted, however, suspicious and nonsuspicious subjects do not significantly differ on any of the criterion scores.[6]

There was no significant relationship between anxiety and D Sy production on either Part I or Part II.[7] There was, however, a significant (p .05) negative correlation of -.27 between improvement in D Sy score and anxiety. When this correlation is determined separately within each group, the correlations are: high achievement--high self-regard, -.23; high achievement--low self-regard, -.42; low achievement--high self-regard, .05; and low achievement--low self-regard, -.65.

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[6] Although chi-square analysis showed the group differences in number of subjects reporting suspicion not to be significant, the high number of the high achievement--high self-regard subjects who reported reluctance to accept reports of their failure is suggestive of the unique qualities of this group.

[7] There were no significant differences in anxiety level among the four experimental groups. The means were as follows: high achievement--high self-regard, 13.6; high achievement--low self-regard, 12.1; low achievement--high self-regard, 14.0; low achievement--low self-regard, 14.5.

There were no significant differences between high- and low-achieving subjects or between high- and low-self-regard subjects on the WAIS Information scale, Vocabulary scale, or sum of these two scores.

DISCUSSION

Effect of Anxiety

The lack of significant relationship between anxiety and D Sy in Part I is consistent with the findings of Goodstein and Farber (1957). The significant negative correlations between anxiety and improvement is consistent with the results of Taylor (1958) and Mandler and Sarason (1952) in that high-anxious subjects did less well after stress in relation to their nonstress baseline than subjects lower on the anxiety scale. When this relationship is examined separately for high- and low-self-regard subjects, the correlation is significant only in the low-self-regard group ($\underline{r}= -.63$, $\underline{p} < .005$); for high-self-regard subjects the correlation between anxiety and improvement is negligible ($\underline{r}= -.05$). These within-group correlations are significantly different from one another ($\underline{p} < .05$) and this significant difference suggests some possible hypotheses for further research. First, it should be noted that the self-description procedure is still in experimental form, having been validated on a sample of adult males, ages 25 to 49. The relative applicability of this procedure with a younger population is still to be demonstrated. In addition, the high-self-regard group may include defensive subjects who either consciously or unconsciously may not give a stable and accurate estimate of their anxiety level. The possible unreliable reporting of anxiety of some high-self-regard subjects may have reduced the negative correlation between anxiety and improvement. Despite these possible limitations, however, the data suggest that the attitude toward the self may interact with anxiety in determining the effect of anxiety upon functioning. Could it be that in a setting of positive self-regard high anxiety may be an unpleasant affect which has little effect on performance, whereas combined with low self-regard, anxiety may result in disruption under stress?

Energy Deployment Patterns

Subjects with high levels of achievement in both scholastic and extracurricular endeavors did significantly better on the D Sy than did their less successful counterparts. In light of the theoretical rationale of the D Sy task, these findings suggest that high achievers have more energy available for their work. It is not necessary to assume, however, that they are individuals who have a greater total energy supply (as, for example, a well-rested subject might have a greater total than a fatigued one).

The finding that high-achieving subjects wrote with less pressure as well as producing more symbols suggests that the difference between high and low achievement is in part a function of the capacity to direct energy into adaptive endeavors. The data of the study do not bear on the question of whether differences in level of achievement are also a function of total available energy.

The differences in D Sy scores between the groups cannot be accounted for by differences in intelligence. The follow-up study indicates that the two groups did not differ on the Vocabulary and Information subtests, and in fact, the low-achievement groups had a slightly higher mean vocabulary score. Vocabulary and Information are considered to be the two best estimates of intellectual level since they correlate most highly with Full Scale IQ (.87 and .88, respectively). In addition, both are untimed tests which limit the extent to which availability or deployment of energy could influence performance. Clearly, then, the differences in D Sy performance in the present study are not a function of intellectual level.

A report of failure given to the subjects following the first completion of the D Sy test did not disrupt the superiority of the high achievers. The high achievers were again significantly more productive and again pressed with significantly less intensity, which suggests that the difference in energy deployment between high and low achievers holds over several conditions.

In the present study, the demands of the task, and thus the contingencies of reward, are clear. Pressing hard is not a task demand, and there appears to be no indication, implicit or explicit, that it will be rewarded. Energy expended in that direction, then, is clearly irrelevant, and pressing hard appears to correspond to what Wishner has called diffuse behavior. Apparently the distinction between focused and diffuse behavior and the notion of efficiency, which is based on the assumption of conservation of psychological energy, are useful in predicting some types of successful adaptive functioning. Academic achievement appears to be a function in part of the capacity to efficienctly channel one's energies into the required task and keep irrelevant expenditures at a minimum, a capacity which may represent the operational correlate of that aspect of the conflict-free ego sphere referred to by Hartmann (1939) as intentionality.

When the theoretical rationale of the D Sy test is considered, the conclusion is suggested that one of the major differences between high and low achievement is the capacity to effectively channel energy in a routine, repetitive, and imitative task. It should be noted, however, that little or no creativity or imagination is required in the performance of the D Sy and though this subtest differentially relates to achievement, the relationship of creativity to grades and energy deployment becomes an intriguing question. MacKinnon (1962), for example, noted a modal grade of B for a group of architects adjudged to be among the most creative in America. Clearly their grades did not reflect their creative potential. It is suggested that the autonomy and independence (Blatt & Stein, 1957; MacKinnon, 1962) noted in creative individuals might result in an unwillingness to devote energy to tasks considered unimportant or trivial. Creative individuals, as compared to high achievers who are not very creative, might express greater selectivity in determining the tasks to which they will devote their energy rather than seeking to achieve indiscriminately regardless of the situation or the task. A useful conceptualization of mental health should, therefore, include more than the capacity to expend effort effectively on a required task and to reduce irrelevant activity; it should also include the capacity to define which activities would bring maximum satisfaction. Some demands presented to the individuals are better ignored, and the capacity of the individual to ignore these demands, restructure them, and organize them hierarchically, seems best conceptualized as independent of the capacity to effectively channel energies into assigned activities.

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Study B:

An Attempt to Test Assumptions About Some Indications of Negativism on Psychological Tests[1]

On the Wechsler Digit Span the usual pattern is for a person to remember more digits in a forward order than they remember in a reverse order. Rapaport, Gill and Schafer (1945) suggest that a pattern of a greater number of digits remembered in a reverse order than in a forward order may reflect, among other things, negativism and a tendency to be oppositional. In the Rorschach literature there is the assumption that a tendency toward negativism and oppositionality can also be reflected in the White Space responses (S) and responses which are based on rare detail (Dr) (Beck, 1944; Rapaport, Gill and Schafer, 1945). Several research strategies could be used to test these assumptions about indicators of negativism in the various psychological tests. Ideally, test variables might be studied in relation to overt behavior, but it is often difficult to obtain reliable measurements of the degree of negativism in overt behavior that occurs in a complex social matrix or in an experimental procedure. At least as a first step, however, one can test assumptions about the psychological test indications of negativism by examining the relationship between the balance of digits forward (DF) to digits backwards (DB) and Rorschach white space and rare detail responses.

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[1] This study was conducted by Elizabeth Fox and Sidney J. Blatt.

From a file of approximately 700 psychological test records, all patients who had DB in excess of DF were selected for study. The diagnoses of these patients ranged from psychoses through neuroses but records were excluded if there was suggestion of central nervous system impairment. The experimental group consisted of fourteen records (7 males and 7 females) and two control groups were matched with the experimental group for age, sex, and Full Scale IQ. The first control group consisted of Ss with DB=DF and the second control group consisted of Ss where DB < DF. These three groups were compared on a number of Rorschach variables.

As presented in Table 1, the data support the assumption that the number of S and the number of Dr responses relate differentially to the balance of DF to DB.

TABLE 1

The Relationship of the Balance of WAIS Digits Forwards and Backwards and Rorschach Variables

	DF > DB N=14	DF=DB N=14	DF < DB N=14	F	P (1 tail)
Age	26.4	24.8	27.0	<1	N.S.
IQ	110.2	108.0	109.0	<1	N.S.
#R	25.6	27.6	34.9	2.21	N.S.
#Dr	1.43	2.07	5.50	7.64	<.01
#S	1.00	1.85	3.36	3.28	<.05
F%	61.62	70.61	66.47	1.08	N.S.
F+%	70.59	70.61	68.54	.25	N.S.
#M	2.15	1.43	1.57	.63	N.S.
M/ΣC	2.32	1.88	1.89	.38	N.S.
P%	24.63	24.28	16.78	1.37	N.S.
H%	20.76	10.28	13.21	3.33	<.05

Though there is a significant relationship between these independent cognitive-perceptual measures which are assumed to reflect negativism and oppositionality, support for the assumption about test indicators of negativism can only be inferential since no direct assessment was made of overt negativism. Yet the expectation that there would be a relationship between the variables on the Wechsler and the Rorschach was based on independent clinical observation and theory. The relationship between test variables and particular psychological processes may require a demonstration that test variables relate to manifest behavior but the relationship between internal psychological states and overt behavior is a complex and difficult problem. There is little of one-to-one, isomorphic relationship between internal psychological states and overt behavior (Skolnick, 1966). Psychological processes are only one determinant of behavior in a complex social matrix (Engel and Blatt, 1963) and though we may understand expressions and indications of psychological states we may not be able to predict how these internal states will manifest themselves in social situations. The more we attempt to place constraints and controls on the variations of the social matrix so there is a limited range of possible behavior, the more the behavior moves toward becoming *only* responses to psychological test procedures. Intercorrelations between independent test variables, such as in the present study, of assumed expressions of negativism on the WAIS and the Rorschach, may prove to be a meaningful way to begin to test some of the assumptions made in the interpretation of psychological tests.

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Study C:

WAIS Digit Span, Digit Symbol, and Vocabulary Performance As A Function Of Prior Experiences Of Success and Failure[1]

The recognition that personality should be conceived "not only as a configuration of dynamic processes, but also as a hierarchic organization that includes quasi-stable processes that have emerged in the longitudinal development of the individual" (Mayman, Schafer, & Rapaport, 1951) has precipitated an expansion in the role of the "intelligence test" in clinical diagnostic testing. This had led to an increased interest in investigations designed to determine the stable and enduring personality factors which subtests seem to assess. One consequence of these studies has been the discovery that performance on certain "cognitive" tasks, and the adequacy of cognitive functioning generally, may reflect emotional and motivational variables.

The Wechsler Adult Intelligence Scale (WAIS) and the Wechsler Intelligence Scale for Children (WISC), which have seen increasing use as part of the clinical diagnostic battery, each contain a series of subtests which emphasize a number of different cognitive functions. The Digit Span subtest, and secondarily the Digit Symbol and Vocabulary subtests, are of particular interest in this study. Digit Span, which presents the subject with increasing lengths of rote numerical material for immediate recall, requires the process of relatively effortless, passive, nonselective registering of stimuli in consciousness referred to as attention (Mayman, Schafer & Rapaport, 1951). Digit Symbol, which presents the subject with symbols to reproduce beneath a series of associated numerals, requires the process of concentration as well as smooth visual-motor coordination in the form of imitative activity. Vocabulary, on the other hand reflects long term memory and concept formation (Mayman, Schafer, & Rapaport, 1951).

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[1] This study was conducted by A. Robert Sherman and Sidney J. Blatt.

Wechsler (1944), as well as Rapaport, Gill, and Schafer (1945) consider that one of the effects of anxiety is to lower Digit Span performance. "A Digit Span score much below the Vocabulary level and/or the Mean Verbal level is mainly indicative of the presence of anxiety" (Rapaport, Gill & Schafer, 1945).

Investigations of this diagnostic assumption, although numerous, have been inconclusive. The various studies have differed in the nature of the subject populations employed, and in the definition of anxiety. Lewinski (1945), for example, found that 84 per cent of the group of anxiety neurotics deviated negatively on Digit Span from their own mean weighted score on all ten Wechsler-Bellevue subtests, whereas Rashkis and Welsh (1946), Gilhooly (1950), Shoben (1950), and Warner (1950) found that the Digit Span had virtually no discriminatory value in comparing anxious and non-anxious patients or subjects.

Wright (1954), comparing normally and abnormally anxious surgical patients on Digit Span before and after operations, and Capretta and Berkun (1962), testing army recruits before, during, and after crossing a high, unstable rope bridge, both found that the stressful experience resulted in a decrement of Digit Span. Studies by Moldawsky and Moldawsky (1952) and by Walker and Spence (1964) employed an experimental induction of feelings of personal inadequacy and a threat of failure. Moldawsky and Moldawsky (1952) found that the experimentally-aroused "feelings of inadequacy" caused a decrement in Digit Span when that test was given after an intervening Vocabulary when it preceded the Vocabulary test. Walker and Spence (1964) found that induced stress did not significantly affect the Digit Span of a total group of experimental Ss but it did impair the Digit Span performance of those Ss who reported being distressed by the experimental manipulation. Thus, in several studies which involved natural or experimentally induced stress there was some evidence suggesting a relationship between stress and decrement in Digit Span performance.

In the administration of the WAIS and the WISC the Digit Span subtest is preceded by several other verbal subtests and it is possible that, in the testing situation, the individual's perception of his failures or successes might cumulate and affect Digit Span performance. Considering the contradictions in the Digit Span literature, the clinicial interpretation of performance on that subtest could be enhanced by further understanding of the possible effects that prior experiences of success of failure within the testing situation could have upon Digit Span.

A pilot study designed to assess the differential effects of experiences of success vs. failure, resulting from misperceived superior or inferior performance on a previous cognitive task, on the subsequently administered Digit Span, Digit Symbol, and Vocabulary subtests, was conducted using a sample of eight female high school students. Contrary to expectation, the experience induced by failure on a difficult anagrams test led to an elevation in subsequent performance on both Digit Span and Digit Symbol compared to the effect of a success experience. Vocabulary performance, on the other hand, appeared to be relatively unaffected by the experimental manipulation.

It was also found that attempts to alleviate the failure experience led to a relative decrease in the performance on a subsequent second administration of Digit Span, whereas the success-experience Ss improved in the second administration probably as a function of a practice effect (e.g., Blackburn & Benton, 1957; Karson, Pool & Freud, 1957; Moldawsky & Moldawsky, 1952; and Capretta & Berkun, 1962). The Digit Symbol difference; as well as the Digit Span change interaction, approached significance ($P < .10$, two-tailed test). The novel findings of the pilot study, and their potential importance for the determination of variables affecting Digit Span performance in the conventional testing situation, lead to the present study.

Method

Forty-three female college students, enrolled in psychology courses, ranging in age from 17 to 21 were randomly assigned to one of the four experimental groups. Success (S), Middle (M), Failure-No Motivation (F-NM), and Failure-Motivation (F-M) groups differed in the nature of an anagrams experience on a success to failure continuum. Within each group the order of Digit Span -- Vocabulary administration was also varied. All subjects were tested individually in sessions which lasted approximately 30 minutes. The sessions began with a brief introduction, and testing consisted of the administration of five tests, the four groups differing essentially only with respect to the second, an Anagrams test. The tests, in order, were: (1) The WAIS Information subtest was administered initially to establish a testing atmosphere as well as to provide an indicator of the intelligence level of the subjects. The only difference from the conventional administration was that the test was discontinued after three (instead of five) consecutive failures to minimize the possibility of a confounding failure-type experience resulting from the perception of five consecutive failures.

(2) Anagrams S, Anagrams M, and Anagrams F. These three lists of anagrams each contained relatively common countries, but the difficulty level was controlled by the arrangement of the letters. Anagrams S was designed to provide a positive success experience, Anagrams F was designed to provide a negative failure experience, and Anagrams M, which was identical to Anagrams S except that two items were replaced by their corresponding difficult forms from Anagrams F. Initial instruction to the S, F-NM, and F-M group included misinforming the Ss as to the difficulty of the test and the average performance for their age group. After the anagram test, the S group was told that they had done very well on the Anagrams test compared to others of their age group, while the F-NM and F-M group was told that they had done quite poorly on the test. The M group, included to provide a general frame of reference for evaluating the effects of the success or failure experience, were told that they had done as well on the test as most girls their age.

The two failure groups differed in that, after the failure experience, only the F-M Ss were told they could make up for their poor performance on the Anagrams by doing well on the next few tests.

(3,4) Digit Span. The WAIS Digit Span was administered with standard instructions. For five of the ten Ss in the S and M groups and in six of the eleven Ss in both the F-NM and the F-M groups, the Digit Span subtest preceded the Vocabulary subtest. For the remaining Ss, the Vocabulary preceded the Digit Span. This counter-balancing of Digit Span--Vocabulary administration was designed to test the effect of proximity to the Anagram experience (Moldawsky and Moldawsky, 1952).

(3,4) Vocabulary. The even-numbered items of the WAIS Vocabulary were administered beginning with item #4. The test was discontinued after three (instead of five) consecutive item failures. The Vocabulary test, generally considered relatively unaffected by emotional states, was included as a control for the specificity of the effect of the Anagrams treatments on the Digit Span and Digit Symbol.

(5) Digit Symbol. The WAIS Digit Symbol was administered with standard instructions. The Digit Symbol forms also included ten sets of carbon papers which provided an index of the pressure exerted while filling out the Digit Symbol form (Wachtel & Blatt,

1965). The number of carbon sets on which marks were detectable was determined both in ascending and descending order, and these two estimates were summed to provide the Digit Symbol pressure measure.

Ss were then given two questionnaires to fill out, one for the Information test and one for the Anagrams test. The questionnaire consisted of fourteen questions related to the S's thoughts about the test and feelings after taking it. The questionnaires were included to assess the nature and effect of the anagrams treatments. The examiner then explained to the subject the exact nature of the study and urged them not to discuss it with others in the various classes.

Results

Ss in the F-NM and F-M groups seemed to be upset by the Anagrams failure experience. This observation was supported by subjects' comments on the questionnaire about the Anagrams, in which they did "poorly" on this "difficult" test which they "disliked," and felt "weary and anxious" after it.

A multivariate analysis of covariance (Hall and Cramer, 1962) produced an F=3.77 for the likelihood ratio criterion in the overall regression analysis with four dependent variables and one covariate; with 4 and 31 degrees of freedom this is significant with $p < .05$. Univariate analyses of covariance (Winer, 1962) for the effect of the order of Digit Span--Vocabulary administration revealed no significant differences for Vocabulary, Digit Symbol, or Digit Symbol Pressure, but produced an $F = 7.70$ for Digit Span which, with 1 and 34 degrees of freedom, is significant with $p < .01$. Thus, it was found that subjects receiving Digit Span after Vocabulary tended to perform better on Digit Span than subjects receiving Digit Span first, regardless of treatment condition.

The Information subtest was administered prior to the experimental manipulations and though the subjects were randomly assigned to treatment groups, significant overall group mean differences on Information were found with the F-NM and F-M groups performing at a lower level than the Success and Neutral groups ($F = 3.96$, $df = 3.35$, $p < .05$). Consequently, in the remaining analysis, the results on Digit Span, Vocabulary, and Digit Symbol were adjusted for the effects of the Information covariate.

Tests for simple effects between the adjusted means (Winer, 1962) on Digit Span, Vocabulary, and Digit Symbol revealed no significant differences between the F-NM and F-M groups; consequently, the data from these two groups were combined into a single composite Failure (F) group which was compared with the S and M groups. Table 1 contains the adjusted group means on Digit Span, Digit Symbol, and Vocabulary, for the overall S, M and F groups.

TABLE 1

Adjusted Means of Success, Neutral, and Composite Failure Groups on Digit Span and Digit Symbol

	Success	Middle	Failure
Digit Span	11.38	12.35	13.47
Digit Symbol	63.80	70.01	71.17

Simple effects tests between the adjusted means revealed that the performance of the F group was significantly superior to that of the S group on both Digit Span ($F = 6.22$, $df = 1.34$, $p < .05$) and Digit Symbol ($F = 4.82$, $df = 1.34$, $p < .05$). The performance of the M group, which fell between that of the S and F groups on both Digit Span and Digit Symbol, was not significantly different from either group on either measure. No between-group differences were found on the adjusted means for Vocabulary.

Discussion

The results of the present study indicate that a prior experience of failure, as compared to a success experience caused a relative elevation of performance on both the WAIS Digit Span and Digit Symbol subtests. It is not clear, however, whether this between group difference is due to the fact that the failure experience lead to an elevation in subsequent performance or whether the success experience lead to a decrement in performance. The fact that the M group fell between the S and F groups does not clarify the question of the treatment effects of success and failure. The data of the pilot study, however, may offer some clarification of this point. Given the same initial Digit Span difference, a subsequent alleviation of the experience of failure lead to a relative decrease in the performance on a second administration of Digit Span, whereas a Success group improved in accordance with an expected practice effect. This suggests that the F group performed at an elevated level during the first administration after the failure experience, and the same is probably true in the present study.

The finding in the present study of an increase in Digit Span following a failure experience seems to add further contradiction to an already inconsistent research literature in the relationship between Digit Span performance and anxiety. Some earlier studies provide evidence which offers support for the assumption made by Wechsler (1944, 1958) and by Rapaport, Gill, & Schafer (1945), that anxiety impairs attention and that this is reflected in a decrement in Digit Span performance. Other studies, including the present findings, seem to offer little support for this hypothesis. These apparent inconsistencies in the Digit Span--Anxiety literature may be a reflection of the different definitions of anxiety and the varied conditions used to induce anxiety experimentally. Lewinski (1945), for example, used a patient population in which there were pervasive symptoms of anxiety. Anxiety has been assumed to be one of the reactions to physically-threatening stress (e.g., Wright, 1954; Capretta & Berkun, 1962) or experimentally induced feelings of personal inadequacy aroused within the testing situation (e.g., Moldawsky & Moldawsky, 1952; Walker & Spence, 1964). One might question, however, whether it is possible to induce consistently, through experimental manipulation, the internal state of disequilbrium and arousal conceptualized as anxiety. An experience of failure or the threat of physical danger may elicit varying degrees of distress and/or anxiety, depending upon the meaning of the experience for the individual. For example, a failure experience in normal and well-functioning _S_s may serve to increase motivation through an optional level of anxiety rather than disrupt performance through excessive anxiety. The increased score on Digit Symbol as well as Digit Span in the Failure group of the present study suggests that the failure experience in a normal sample may have had this effect of increasing motivation. Digit Symbol has been conceptualized as a test of energy deployment (Rapaport, Gill & Schafer, 1946; Wachtel & Blatt, 1965) and as reflecting a "striving and a desire to achieve when intellectual demands are not excessive" (Allison, Blatt, & Zimet, 1967). The findings of an elevation of Digit Symbol after a failure experience is consistent with prior studies (Gallahar, 1964; Sarason & Minard, 1962) which also found that achievement orienting instructions (threat of failure) elevates Digit Symbol performance, particularly in female students. On subsequent research with the Digit Span and experimentally induced stress, it seems important, therefore, to assess S's predisposition for becoming anxious and to differentiate Ss who can be (or who are) made anxious by a procedure from those who can manage anxiety and not be disrupted by the experience (Blatt and Allison, 1967). In this regard, Walker & Janet Spence (1964) found a reduction in Digit Span only in those Ss who reported being distressed when told they were selected as Ss because of questionable academic performance.

There are several additional points raised by the results of the present study. It should be noted that Ss receiving Digit Span after Vocabulary tended to perform better on Digit Span than Ss receiving Digit Span immediately after anagrams, regardless of treatment condition and this finding is inconsistent with the results reported by Moldawsky and Moldawsky (1952). Thus, even though the failure experience tended to potentiate Digit Span performance, it seems that proximity to the Anagrams experience decreased the amount that failure increase Digit Span.

The pressure of writing during the Digit Symbol test tended to differentiate the Failure-NM and the Failure-M groups, with the former pressing harder. It is possible that the increased pressure of writing in the F-NM group reflects an attempt to discharge tension, in contrast to the Failure-M group which was encouraged to compensate for their poor Anagrams scores on subsequent tests. Further research is necessary, however, to clarify the meaning of the pressure score. Likewise, findings of the present study with the Digit Span and Digit Symbol subtests and the contradictions in the literature indicates a need for further clarification of the effect of various stress conditions on a variety of cognitive processes. This may require more systematic attempts to understand the concept of anxiety and how this complex individual dimension interacts with a variety of situational factors.

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CHAPTER XI

Anxiety, Attention, and Coping with Threat[1]

Anxiety is a response of an individual to a situation of danger, and is adaptive to the degree that it aids the individual in coping with the threat. Some threats may be coped with quite readily, whereas others offer little or no opportunity to avoid or reduce the danger. It might be expected that the consequences for psychological functioning of these two kinds of threatening situations would differ.

It has been suggested that a major effect of anxiety is a narrowing and focussing of the field of attention, with heightened responsiveness to central cues and reduced responsiveness to more incidental cues (Easterbrook, 1959; Korchin, 1964). This formulation has proved useful in integrating many conflicting reports of the effect of anxiety upon performance, and also provides helpful clues about the experience of the anxious individual. The present study, therefore, attempted to gain further evidence of the "reduction of the range of cue utilization" (Easterbrook, 1959) under anxiety and to determine how this may be modified when a means is provided to cope with the anxiety-provoking threat.

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[1] Dr. Paul Wachtel conducted this research and prepared this chapter which is currently in press in the Journal of Abnormal Psychology.

METHOD

Subjects

The subjects were 70 freshmen men at Southern Connecticut State College. Each S was seen individually in an office at the Yale Psycho-Educational Clinic.

Apparatus

The main experimental task for the study was a continuous tracking task[2] similar to those used by Bahrick, Fitts, and Rankin (1952) and Bursill (1958). S was required to track a metal target which moved back and forth irregularly in a vertical path. A metal pointer was moved up and down by S, and whenever the two metal pieces made contact, an electric timer was activated, thereby enabling S's total time on target to be accurately recorded.

The tracking task was mounted on a board, on which were also placed two orange 15-watt bulbs, one to each side of the tracking path, and at the periphery of S's visual field. At 10 points in the course of the tracking, one of these lights went on. S was able to turn off either light by pressing a switch on the table in front of him, while he continued to track the target with the other hand. A second electric timer was set into motion by the onset of either light. When S turned off the light, the circuit for the timer was broken as well, and thus the exact amount of time the light was on could be recorded for each onset. The reading of the tracking timer was recorded at each onset as well, and so the progress of performance on both tasks through time could be observed.

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[2] For more detailed description of the experimental apparatus and procedure, see Wachtel (1966).

The tracking task occupied the center of S's visual field and required continuous attention as well, and it was expected that the lights, response to which was required only occasionally, would be viewed by S as less relevant. Observation could then be made of S's response to stimuli both central and peripheral in his attentional field.

Procedure

Ss were randomly assigned to one of four experimental groups. These groups differed in the instructions received by Ss regarding the meaning of the above described apparatus. The instructions received by each of the four experimental groups were as follows:

> Group I - Control group - This is one of the experimental tasks I referred to earlier. It's a gadget that we have developed here and we have just begun to try it out. We don't really know yet how hard or easy it is, what sort of people do well, or what it feels like to do it. What I'd like you to do is just to try it out for us and let me know what it feels like. Here, you'll notice, is a little piece of metal. This metal moves up and down in this slot here. This other piece of metal is a pointer which can be moved up and down by you, like this (E demonstrates). Your job is to track the moving piece

> so that it is covered by the pointer. In addition, at various points while you are doing this, one of these lights will go on (E turns on lights). When it does go on, you are to turn it off as quickly as possible with this switch here. Your score will be the amount of time you are on the target with the amount of time the lights are on subtracted from it, so you have to be able to pay attention to both the tracking and the lights.

Group IIa - Subjects in this group were given instructions identical to those for group I, but then were told the following in addition:

> Now, in addition, this study is concerned with understanding the effects of stress on performance. We are particularly interested in comparing the effects of small but frequent stresses and infrequent but major stresses. Therefore, at various points while you are performing the task, you will be receiving an electric shock. These shocks may at times be quite painful, but they are not dangerous. So that we can compare small and frequent with large but infrequent stresses the severity of the shock will depend on how long the interval between shocks is. The longer it is before you receive a shock, the more painful it will be. As I said before, the shocks may be quite painful, but they are not dangerous, so please try to go on despite the shocks.

The subjects in this group were told that the severity of shock would be greater the longer the time before the shock occurred because it was felt that as time went on and S did not receive a shock, he might begin to doubt that a shock was coming and consequently become less anxious. The threat that a shock occurring later would be more severe was expected to counteract such anxiety reduction and thus enable the maintenance of a state of anxiety over the period during which observations were being made.

Group IIb - The possibility presented itself that any differences between groups I and II could be attributed not to the anxiety-arousing quality of the additional instructions but to the fact that the added instructions were given after the task instructions and might cause S to forget the latter. If Ss in group II did not react as quickly as group I subjects to the lights, it might be interpretable as the group II subjects not having remembered as well as the control group the instructions to turn out the lights immediately. In order to control for this possibility, half of the group II subjects were assigned to group IIa as described above, and half were assigned to group IIb. Subjects in IIb received the stress instructions first (beginning with "This study is concerned with...") and then were told the nature of the tasks exactly as the other groups.

Group III - Subjects in this group received instructions identical to those for group I, but then were told the following in addition:

> Now, in addition, this study is concerned with understanding the effects of stress on performance. Therefore, at various points while you are performing the task, you will be receiving an electric shock. These may at times be quite painful, but they are not dangerous. It also may be possible for you to avoid the shocks. If, at the time a shock is scheduled to come, your total score is above a certain point, you will not receive the shock. Otherwise

> you will receive a rather painful shock. As I said before, the shocks may be quite painful but they are not dangerous, so please try to go on despite the shocks.

Thus, group III subjects received a threat similar to that received by group II subjects, but were provided with a means of coping with the danger.

After receiving the instructions, all Ss in groups II and III were wired up to a "shock apparatus," which consisted of an aluminum chassis with some dials and switches and a pilot light which E turned on when S began. Electrodes leading from the box were attached to each arm of the subject.

Group IV - This group was originally included as part of an effort to study defense as an attentional process. That aspect of this research is not reported here, but group IV will be discussed here in another context, and is therefore described. It should be noted that in group IV, unlike the other groups, the lights were given a particular meaning -- they served as a warning that S was doing poorly. Thus group IV was not strictly comparable to the other groups, and within-group comparisons will be the focus of interest for this group. Comparisons of the means of group IV with those of the other groups may be ambiguous because of the major difference in instructions.

Group IV subjects were told the following:

> This is another personality diagnostic instrument which we will use to assess your personality and your mental health. It is a test of perceptual-motor coordination and capacity to anticipate patterns, both important factors in mental health. Here, you'll notice, is a little piece of metal. This metal moves up and down in this slot here. This other piece of metal is a pointer which can be moved up and down by you, like this (E demonstrates). Your job is to track the moving piece so that it is covered by the pointer. Because this is such an important test, we like to give people some feedback on how they are doing, so at various intervals your total time on target, which is registered on this clock here, will be checked. If you are doing poorly, one of these lights will go on (E turns on lights) as a signal that your performance up to that point is sub-par. If the light does go on, you are to turn it off as quickly as possible with this switch here. Your total score will be the amount of time you are on the target with the amount of time the lights are on, if they go on, subtracted from it, so you have to be able to pay attention to both the tracking and the lights. The lights will only go on, remember, if you are doing poorly.

For all four groups, at the end of five minutes of tracking, S was told to stop and that he would continue shortly. Those in group I were just told that they were getting a chance to relax before going on; those in groups II and III were told that the shocks should have been coming and that E was going to check the shock apparatus; and those in group IV were told that they had been doing poorly and would be given a chance to relax before going on. S was then given a brief questionnaire about his feelings during the experiment to fill out while he was waiting to continue.

Another means which presented itself of assessing the range of cue utilization for any S was to determine how much additional information not relevant to the experiment was picked up by S while performing the task. After the administration of the questionnaire about his feelings during the experiment, but before the nature of the experimental manipulation was explained, S was blindfolded and asked to name as many as he could remember of a large variety of objects on E's table. These objects were covered by a lab coat until after the specific group instructions were given. E then unobtrusively removed the lab coat in the course of sitting down at the table and preparing to record the data. These objects were therefore visible only during the time that S was performing the tracking and reaction time tasks and while he was filling out the questionnaire about his feelings during the experiment.

After this procedure, S was told that the study was completed. The nature of the experimental manipulation was explained to him, and he was told that all that was left for him to do was to fill our some questionnaires for another study being conducted by another member of the Yale Psychology Department. He was led into another room where he filled out alone the Rosenzweig P-F Test[3] and the Sarason-Mandler Test Anxiety Scale (TAS). This was presented as part of a separate study to limit the influence of the experimental procedure on the responses to the anxiety questionnaire. This questionnaire provided a measure of individual differences in anxiety as a personality variable, thus complementing the comparisons based on direct experimental manipulation of anxiety.

RESULTS

The major criterion scores in the study were the total amount of time in minutes that *S* was on target during the five minutes of tracking (tracking score) and the mean of the reciprocals of the reaction times to the lights (speed). These scores were relatively independent (r=.21) and had split-half reliabilities of .89 and .76 respectively.

The mean speed and tracking scores for groups I, II, and III are presented in Table I. The differences between groups IIa and IIb on the tracking and speed scores yielded t's of .35 and .40 respectively, with 17 and 14 df. These differences seem safely attributable to chance, and therefore in further discussion reference will be made to a combined group II with a tracking score of 99.26 and a speed score of 1.75.

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[3] This test was given primarily as filler before the anxiety uestionnaire was filled out, and the results will not be dealt ith in this paper.

Table I

Mean Speed and Tracking Scores by Group

Group	Tracking Score	Speed Score
I	103.59	2.18
II	99.26	1.75
III	98.38	2.11

An analysis of variance indicated no significant differences among the 3 groups (I, II, III) in tracking score (F=.40), but for speed scores an F of 11.96 was obtained, which with 2 and 52 df is significant at beyond the .001 level. It was expected that the variation among the three groups on the speed measure would be due to the difference between the score of group II and the scores of groups I and III combined: group II was expected to show an impairment in response to peripheral stimuli as compared to the control group, but group III was not expected to show such impairment, since group III subjects had an opportunity to cope with the threat. Weights of 1, -2, and 1 were therefore assigned to correspond to the predicted pattern. The F obtained for regression of the group means on the weights by the method of contrasts was 22.39, which was significant at beyond the .001 level. The residual was nonsignificant. This pattern therefore accounted for a significant amount of the variation among the group means, and there was no significant deviation from this pattern. Groups I and III had higher speed scores than group II.

To summarize this portion of the data, there were no significant differences among the groups on the tracking scores, but on speed scores groups I and III did significantly better than group II and did not significantly differ from each other. Thus, peripheral performance seemed to be impaired under threat of electric shock, but not when the subject had a means of avoiding shock.

The possibility was considered that the similarity in performance between groups I and III and differences between II and III were attributable to a diminution in anxiety through time in group III; as they saw they could avoid the shocks, group III subjects might have ceased to be concerned about the possibility of shock. They would thus differ from group II subjects on the reaction time task because over a portion of the task period they were simply not anxious subjects. According to this view, group III subjects might be expected to perform like group II subjects in the beginning of the experimental period, while they were still concerned, but to perform more like group I subjects toward the end, when they were no longer concerned. To check this possibility, the scores of all groups were looked at separately for the beginning and end of the 5-minute task time. Analysis of variance of the speed and tracking scores for each half separately indicated essentially the same pattern of scores for each half as for the entire experimental period. The difference in responsiveness to the peripheral stimuli between groups II and III did not occur just at the end of the experiment, when group III subjects might have stopped being anxious, but was evident throughout the entire experimental period. Even in the beginning, group III subjects were more responsive to the light.

Test anxiety and performance

An analysis of variance of the mean test anxiety scores for each experimental group indicated no significant differences among the groups in mean anxiety score. The groups also do not significantly differ in variance on this measure. These results suggest that the experimental maniuplations did not differentially influence the test anxiety scores, despite the fact that the test was administered subsequent to these manipulations. It is, of course, possible that the manipulations affected the relative ordering of scores within each group, but the lack of between-group differences makes this seem unlikely.

The correlations between TAS score and tracking score for each group were as follows - group I, .14; II, .17; III, .58; IV, .02. The correlation for group III is significant at the .01 level. The other correlations do not approach significance.

The correlations between TAS score and speed score for each group were as follows - group I, .04; II, .09; III, -.35; IV, -.44. The correlation for group IV is significant at the .05 level and that for group III approaches significance ($p < .10$).

If the correlations between test anxiety and speed for groups III and IV are converted to Z scores and combined, a correlation of -.40 is obtained, which for 30 subjects is significant at the .01 level.

Perception of irrelevant objects

The number of objects from E's table named while S was blindfolded was considered as a possible additional indicator of response to peripheral stimuli. There were no significant differences among the groups on this measure. The considerable interest of almost all subjects in the experimental task, however, may have prevented the noticing of objects from providing a measure of broadness of attention. Subjects in all groups hardly noticed the presence of the objects at all, and the low scores of the non-anxious left little room for impairment under anxiety to be demonstrated.

Discussion

The results of the study are compatible with the hypothesis that anxiety deriving from a threat that cannot be reduced by the individual reduces responsiveness to peripheral stimuli.

Ss who were threatened with electric shock had significantly longer reaction times to the peripheral lights than did subjects presented with exactly the same task who were not threatened with shock. The groups did not differ on the central tracking task. Thus anxiety did not generally impair all performance, but only performance on peripheral aspects of the task. This effect is not explicable as reflecting a special impairment of reaction time tasks by anxiety, for anxiety has been found to have no effect upon (Farber & Spence, 1956) or to speed simple reaction time (Johanson, 1922; Wenar, 1954).

It still remains to be answered whether anxiety reduces responsiveness only to stimuli in the physical periphery of the visual field, or whether the stimuli which become "peripheral" are determined by a more complex psychological process involving the conceptual structure of the task and the needs of the subject. There is some suggestive evidence for the latter position (e.g., Silverman, 1954; Silverman & Blitz, 1956; Engler & Freeman, 1956; Kohn, 1954), but further work along these lines is needed to clarify the issue.

The finding of a significant negative correlation between test anxiety and speed scores in groups III and IV may be viewed as an extension of the finding that anxiety reduces responsiveness to peripheral stimuli. The TAS is presumed to be a measure of the individual's tendency to experience anxiety in evaluative situations; when a situation is not so structured, TAS scores are not likely to be a good indicator of anxiety *in that situation*. In groups III and IV, the quality of *S*'s performance is stressed, and he is led to feel that doing well is important; in groups I and II, on the other hand, a task orientation is stressed, and the evaluation of *S* is minimized. Therefore, only in groups III and IV should TAS scores reflect differences in *anxiety experienced while performing the task*. In those groups, and only in those groups, high TAS scores were associated with long reaction times to the lights, and this finding seems to be another indication that anxiety reduces responsiveness to peripheral stimuli.

It had been expected that by focussing attention, anxiety would lead to higher (central) tracking scores. Some evidence for enhancement of central performance under anxiety was obtained from the significant positive correlation between TAS scores and tracking scores in group III, but in group IV, in which the TAS was also viewed as a valid indicator of anxiety in the situation, the correlation was close to zero. In addition, threat of shock had no effect upon tracking scores.

The data thus offer little support for the notion that anxiety enhances attention to central stimuli. In the present study it is possible that non-attentional factors, such as impairment of fine motor coordination by muscle tenseness could have cancelled out the effects of greater attention to the central task by anxious subjects. Other studies utilizing non-motor measures, however, have also indicated reduced attention to peripheral aspects of tasks under anxiety but not enhanced attention to central features (e.g., Aborn, 1953; Silverman, 1954; Silverman & Blitz, 1956; Kohn, 1954).

It is clear that a moderate degree of anxiety can at times be associated with improved performance. Explanations based upon the drive aspect of anxiety, (Farber, 1954) and its effect on response variables are useful in understanding such events. In addition, from the point of view of attention, the cautious and dependent (Sarason, et al., 1960) high anxious individual may sometimes gain higher scores by centering his attention on the task assigned by the experimenter. The low anxious individual may be freer to explore the stimulus field and may focus on other more interesting stimuli. One might consider whether tasks on which high anxious people do well tend to be uninteresting and hence unlikely to remain the center of attention of low anxious subjects.

Availability of coping behavior

Subjects in the present study who were threatened with shock but given a means to avoid the shock (group III) did not exhibit the reduction in peripheral performance shown by subjects receiving the same threat but given no means of dealing with it (group II). It is possible that, having been given a means of escape, the subjects in group III were less anxious that those in group II. Their responses to post-experimental questioning about their experience while performing the task suggest that this was not the case; both groups II and III reported greater tenseness than did the control group, and their reports did not differ from each other. The possible influence of demand characteristics must be considered, however, in evaluating such reports. At any rate, it is clear from the performance of group II that the threat utilized was one capable of arousing anxiety in the subjects, for group II _S_s reported feeling more tense than control _S_s during the task period, and performed differently from the control group as well. Thus the least that can be said is that a threat capable of producing impairment in response to peripheral stimuli did not produce such impairment when a means was presented of coping with the threat.

It has been noted (Janis, 1962) that sustained fear may lead to inefficient mental functioning and poor discrimination between safe and unsafe features of the environment. Since to the fearful person the features of a percept which signal danger are central and the other features peripheral, reduced responsiveness to peripheral aspects of a stimulus aggregate would lead to just such poor discrimination. Thus, for example, a threatening statement, said jokingly, might be responded to as a serious threat if just the words were attended to, but not the smile or tone of voice. Significantly, Janis also indicates that the presence of existing escape routes may help reduce indiscriminate vigilance. Such escape possibilities may be thought of as providing the individual with means of coping with the threat.

The distinction made in the present study between threat situations where coping is possible and those where it is not seems related to the frequently made distinction between anxiety and fear. Anxiety, for which no clear external referent can be identified, impairs functioning far more than fear, which "focusses on isolated and recognizable dangers so that they may be judiciously appraised and realistically encountered." (Erikson, 1950). When the signaled danger is vague and non-specific, it is difficult to find a way of coping with it, and greater narrowing of attention is likely.

Several important questions remain to be answered. Although no differences in performance were noted between the control group and group III, it is possible that differences might have been evident had subjects' thresholds for other stimuli been observed. Anxiety due to an avoidable danger may not narrow attention in the same way as anxiety due to a threat which cannot be coped with, but may nonetheless restrict attention to those stimuli relevant to coping with the threat, increasing the threshold for all other stimuli. Studies are now being planned to explore this possibility. A related question is to what extent the level of anxiety automatically determines the range of cue utilization and to what extent the individual can adjust his attentional range to the demands of the task when a task is viewed as leading to threat reduction.

Finally, it should be noted that in the present study, the structure of the situation determined whether or not it was possible to cope with the danger -- some subjects were told the shock depended on what they did, and others were told their behavior was irrelevant. It is to be expected that individuals will differ in the extent to which they define a situation for themselves as one in which they can or cannot cope with an impending danger. Self-esteem, confidence, resignation, and despair are all relevant here, as well as defenses, which may distort the individual's estimate of his capacity to cope, or may even be the only means of coping with anxiety available to the individual. Further research is called for to explore these individual differences and relate their influences to those of the variables studied here.

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